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KOFOED, CARL
FEBRUARY 1951 - NOVEMBER 1952

PANAMA - PERU - CHILE

FEBRUARY 1951 - NOVEMBER 1952

*CATALOGUE NOS. 909-1700

*JOURNAL

SPECIES ACCOUNT

Vicuqna [PART 2]

* not included in this volume

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SPECIES ACCOUNT
Vicugna [PART 2]
pages 253-529

Vicugna

November 16, 1951

Huaylarco, 13000', Dpto. Arequipa

of this band, which departed, appeared to be an old ♂. 11:45, soft sparse hail falling. 11:50, ad. def. + urin. By 1 p.m. no further defecating or lying down. Weather bright, warm, overcast. I moved up to km. 138 3/4 to watch the usual 8, but only 7 (3 young) [this a different band] in the group, 200 yds. S. of road. 1:15, ♂ of 6 (1^{male} young) from 300 yds. S. (in usual draw) dashed fast into the 7 + drove them 200 yds. up the stream bottom, then returned toward its group. The 7 grazed then near creek bed. 1:30, ♂ (of 3 group) from 1/4 mile up canyon dashed toward the 7, + when it was 100 yds. away (3 young) the 7 ran up slope to S. other groups of 5, 6, + 8 within 200 yds. of the 7 there, but the ♂ did not chase them. ♂ ran back to its 2^(one possibly juv.) 200 yds. S. of km. 139, a group of 11 (5 young) grazed (1:45). 2:15, one juv. prone 5 min. 2:30, 4 juv. walked 50' toward 2 geese which walked away. One juv. made quick dash at geese but stumbled + fell. Group about 300 yds. S. of road. Light rain. 2:38, group ran 50 yds. as foreign a ♂ ran at them; ♂ of a group stood near it then, both with tails up, testicles visible. Group behind ridge. The foreign ♂ [prob. ♂ of adj. band in N. branch E. 139 Draw] grazed near group, + it (?) walked 20 yds. away at 2:45. One juv. walked after 2 geese which walked away 10' ahead of it. 2:50, two juv. defec.; one, also urin., seemed ♂. One juv., then 3, walked toward geese which, at 15', walked away. One goose flapped wings + juv. ran away several steps. 3 p.m., ♂ which had been a little (20 yds.) apart walked, then ran, at 5 juv. together. They ran to group + ♂ of group, tail up, interposed itself between group + chaser. The foreign ♂ chased one juv. a few yards, then grazed 10 yds. from bunch. An ad. ♀ defec. + urin. - so group

Vicugna

November 16, 1951

Huaylarco 15000', Opto. Arequipa

evidently 1 ♂, 5 ad. ♀♀, 5 juv. 3:02, the 11 walked 100 yds. NE away from foreign ♂ in straggly line, + ♂ did not follow. 3:15, this (?) ♂ chased 2, not of the 11, for 300 yds. The 11, scattered 50 yds., grazed diligently on ^{green} slope. 3:35, one juv. defec. 3:45, group had moved 100 yds. W. - to about where first seen today. ♀ juv. d. + u. juv. twice put muzzle to belly adult as to mummy, but adult raised leg + that side + juv. moved off. 3:52, ad. ♀ defec. + urin., urin. starting during defec. 4:04, ad. ♀ walked 100' to left, defec. + urinated. 4:08, ♂ of 11 walked 50 yds. W. of ♀♀ up a slope toward 2 ad. at 100'; the 2 ran, one (♂) with tail up + head low, for 30 yds. 4:15, 2 ♂♂ only 50' apart but grazing peacefully. Half of the band have joined their ♂, others (5) are 70 yds. down slope. 4:25, a juv. def., then ad. ♀ d. + u. same side. 4:30, all returned to foot of hill, ♂ last. Ad. ♀ def. + urin., then a ♂ juv., then the ad. ♂ (juv. nosed male, then shook head, 3x before defec. - also raised head in partial "wolf howl." It d. + u. in manner of ad. ♂). 11 I went to km. 138 1/2. 8, 200 yds. S. road, but only 2 young (the 7 seen earlier today?). [No] [usual 8]. a young approached ^{ad. ♀} + 6' away staggered, head down back + tail up vertically, dropped to front ~~low~~ wrists, then prone - another ♀ ad. ran up behind young. It struggled to feet, fell to wrists, then up + walked away (nervous?) (4:45). A group of 23 on slope 1/4 mile W. of the 8, 5 (the usual group?) separated 30 yds. from nearest of 18 others. 4:55, one young nursed at right side ♀ for 1 1/2 min. Then mother ~~was~~ stepped away, lay prone, rolled, ~~rose~~, shook head, rose. Some ^(or instead) walked to streamside as 8 spread 150 yds. (5 p.m.).

Vicina

November 17, 1951

Huaylarco, 15000', Depto. Arequipa

Sunrise about 5:45 + many seen grazing before 6 a.m. At 7:20, km. 140 $\frac{1}{2}$, group of 33 100 yds. S. of road. Apparently all males. About 10 youngish but perhaps yearlings, ~~not~~ ^{none} definitely appeared to be young of year. One moved from pile, shook head, did "wolf howl." One nibbled at neck another, then nodded head 5 \pm x. One σ^7 defec. on pile. By 7:45, 5 prone (^{one} + leg on side). Prone one seen to yawn, nibble grass. Prone ones chewed cud. 7:52, an 8th lay down, all down ones near a central feces pile. 7:55, 2 rose. Whole group spread 100 yds. 7:59, one moves pile, shakes head. Then lies prone nearly (7 down, 3 on sides with neck on ground). 8 a.m., 1 rose, then another. All but 1 of the 7 down were yearlings (or juv.?). 8:01, only 4 still down; 3 at 8:02. One defecated as it grazed near feces - small stimulates? 8:03, another up, shook head. Group working E. along sidehill. 8:05, one prone on sidehill. Hill rocky but of green aspect. 8:07, prone yearling up, defec. - testicles visible. Then old σ^7 up (scars on neck). When yearling had passed 6' in front prone old σ^7 , latter put ears back as if to blow or spit at yearling. Old σ^7 had ^{cripple} swelling ^{just} above hoof, at joint, on right hind leg + held it 6" off ground as walked. A sneeze sound heard - all startled + congregated save 2. One of these defec. The 2 lattered 80 yds. behind group as group moved E. Moved $\frac{1}{4}$ mile, still 100 yds. S. road. Had excellent view of 2 small ones as they def. & ur. - ~~no~~ testicles apparent so very probably ≤ 1 year old. These d. & ur. in manner ad. σ^7 . The 2 in rear joined group. If some are young of year, about 5 of the total seem to be juv. 8:25, the 33 in a shallow arc, abreast, in ragged formation, spread 120 yds. A yearling

Vicugna

November 17, 1951

Huaylarca, 15000', Dpto. Arequipa, PERU

raised pile, gave wolf howl, repeated; then d. + ur., tail out horizontal
 8:33, a yearling def. same pile, tail up 45°, did not urinate. The
 pellets hang together as by threads as they emerge from anus. Group
 spread about 200 yds. in ragged line. 8:37, lone ad. ♂ appeared
 on ridge 100 yds. S. of group, defec. on pile, then loped to 100' from
 eastern end of group & the 15⁺ vicuñas then started walking to W.
 ♂ did not attack but stood & watched, occasionally taking a few
 steps. 8:41, ♂ ran to group & they ran away to W. Lone ♂ chased
 4 to W. past all others but no contact, then stood as 12 others
 walked or ran by to W. passing 5 yds. downhill from lone ♂.
 Lone ♂ carried tail arched. 8:43, it loped toward other part of
 group, back to E., & stood 20 yds. from them. Some of group
 took several quick steps away. 8:47, ♂, head low & tail out,
 ran 10 yds. toward group & they retreated. ♂ stopped, tail down,
 & looked. Then tail up ran to pile & defec. some. Dashed 5 yds.
 toward part of W. contingent of group which was walking ^{back} back
 to E. contingent (now 200 yds. S. road). 8:50, the E. contingent, about
 18, headed E. together, & lone ♂ ran to top feces pile 50' from
 them & stood, head + ears high. This bunch over ridge out of sight
 8:54. 8:55, 3 juv. or yearlings of W. part of 33, def. & ur. One raised
 pile & then threw head high. Another kicked hind feet out alternately
 3x as it left pile - dung stuck to feet? P.A.M., 6± of W.
 contingent started toward separated E. contingent. 3 stopped & def.
 & ur. on one feces pile. 16 still on road side of hill, chasing ♂ &
 others out of sight over hill. all 16 work E. slowly, scattered. One
 defec. a few pellets on a pile. 9:06, yearling ad. defec. on another
 pile. 9:10, the 16 showed no strong tendency to join the rest of

Vicugna

November 17, 1951

Huaylarco, 15000', Dpto. Arequipa

group on other side of hill. 9:16, the group started E., some on the run, over hill. I drove up to km. 140^{5/6}. 50 yds. S. of road a group of 4 (1K, 107, 2♀?). The young smaller than any in the 33. Probably when ♂ young get to certain stage & start to act like ♂♂, the ad. ♂ of band drives them out & they join the big bands ♂♂. I watched the 4 at km. 141. One (ad., ♀?) defec. on pile, moved pile, worked fastest later. nately & slowly 12x on pile, walked off pile. 9:45, only grazing. 9:48, one rolled, rose, shook dust out of body. Then juv. rolled, lay on side 1/2 min., ^{prone 5 sec.,} rolled on other side, then remained lying on side. One (♀?) lay prone next to juv. (9:49). 9:51, juv. prone, the 2 almost touching, facing opposite directions. 10:00, a fifth approached to 50' from the 4, & no interaction; apparently one of the groups. 10:15, the 5 100 yds. S. of km. 141 mark grazing on rocky hill. 410 cumulus clouds, warm, light breeze.

November 19, 1951

Arequipa, Dpto. Arequipa

Jack Dwyer told me that he raised a young vicuña at Arequipa & kept it about 8 years, feeding it on lawns & pasture. It was loaned to another man & died soon, perhaps from being fed alfalfa.

November 22, 1951

Huaylarco 15000', Dpto. Arequipa

At 7:30 a.m., group of 9 30 yds. S. of road at km. 136 1/2, all appearing youngish (♂♂?). 7:45, group walked away from car (I stopped 75 yds. from them), & 5 defec. (~~2 or 3~~ 2 or 3 min. too); all ♂♂ but testicles inconspicuous on most. I moved on to km. 137, where 200 yds. S. of road a group of 4 (1 called or I stopped), 107, 1 young, ^{ad.} ♀ and yearling (possibly older juv.) - prob. older juv.; darker & more elong. head but scarcely larger than smallest & ^{much} ~~not~~

Vicugna

November 22, 1951

Huaylarco, 15,000' Depto. Arequipa

smaller than ad. ♀. If so, orphans adopted or some young separated from mothers & have joined bands. 8:15, yes, 2 juvs. 8:20, the ♂ loped to NW toward 6, 250 yds. distant, stopped 150 yds. from them, then continued on. at 100 yds. distance, the 6 fled and the ♂ of 4 stopped. ♀♀ of the 4 had run 50 yds. after ♂. All on nearly flat ground. 8:23, ♂ tail arched \cap , walked back toward its group. 8:30, ^{ad. ♀} prone, chewing cud. 8:35, younger juv. ran a few steps from elder. 8:39, ad. ♀ arose & walked toward ♂, juvs. following. Then all grazed among thorn bushes in 25' drain. at edge of rocky streambed. 8:48, ad. walked to opposite ends of a pool (not running) in streambed & drank, & at least 1 juv. drank. Many nyle to water 5 ± sec. 1 or 2 x. Then, ♂ leading, the group walked up shallow draw to SE. after 200 yds., ♂ to pile, noded it 3 sec., then shook head & did ungl-hawl; repeated 2x more. Then youngest juv. defec. on pile, spread legs further & squatted more to urinate (♀). all then grazed near that pile (8:57). Suddenly 3 ^(not ♂) ran 2 or 3 bands quickly (re-sar?) & grazed again immediately. The ♂ grazed 40 yds. uphill from the 3. 9:20, the 3 quickly ran toward ♂, then all walked slowly over ridge. ^{older Next to youngest, speaking?} about 300 x 50 yd. space covered since 8 a.m. 9:35, at km. 138 ⁷/₆, group of 5 (1 small young) and 7 (2 larger young) 25 yds. apart, 100 yds. S. of road, on grassy flat near stream bed. 5, no juvs., as usual 400 yds. S. road at km. 138 ⁷/₆. 9:38, one ♂ after other, chase reversed, then reversed, the 7 retreating 20 yds. & ♂ of 5 running victor. mouths open as to bite at necks or sides. Throaty cries. The ♂♂ remained 10 yds. apart, harnes 50 yds. apart. Evidently a territorial boundary

Vicugna

November 22, 1951.

Huaylarco, 15000', Dpto. Arequipa

here. 9:45, ♂ of 7 pushed neck on grass, then down + thrust 3x
 one side, penis visible in ventral view. The 7 evidently same group as
 the 8 earlier this month. || 9:48, group of 17⁺⁷ (or +, prob. ♂♂), 100 yds.
 up draw from the 5. 9:50, one^{ad.} of 7 went 75 yds. to W. to-
 ward 6 (1 young) about 300 yds. away. 9:58, unaccountably,
 this later 6 started to N. + crossed road, the nearer 6 did like-
 wise, + all the others disappeared from my view (probably dog near) (?). || at km.
 138½, 20 (or +) 400 yds. S. road atop hill. Km. 139, 5 (1 juv.), 150 yds.
 N. road, but 2± min. after I stopped they walked slowly over hill. || at
 2:30 p.m. I saw 4 run ¼ mile across barren flat ground at
 foot of lake. || 3:50, km. 138½, the 7 (2 juv.) at road, 2 on N.
 side. As car approached 1 od. went N. + rest to S. of road;
 none went over 50 yds. from road. The 5 (0 juv.) at usual
 site 400 yds. S. of road on flat of creek tributary. The 6 (1 juv.)
 about to 150 yds. S. of km. 138½. 2/10 cumulus; dry hard
 W. wind. ♂ of the 6 walked toward 22 approaching 250
 yds. away. after various stops, ♂ chased some of 22 +
 they ran to S. over hilltop, ♂ after them. The rest of the 6 had
 gone 100 yds. W. after ♂ left; all, or all save 1 od., defer. The juv.
 maybe a ♂. ♀♀ work forgot on pile as ♂♂ do. Then the 5
 (of 6) went E. 150 yds. + grazed (nearer to where ♂ departed).
 ♂ had stopped^{at this place} to defer. on way to chase of the 22. 4:04, the ♂
 of 6 appeared atop hill 200 yds. E. of the harem, then ran to-
 ward harem 50 yds.; then walked, stopping 100 yds. SE of harem
 to graze. 4:15, the harem (of 6) walked slowly toward ♂. ♂ went
 away over hilltop as if chasing others again. One^{ad.} ♀ followed
 close behind other as if spitting at it, both with ears back. One

Vicugna

November 22, 1951

Huaylarco, 15000', Dpto. Puno, Arequipa

♀ ad. kicked out at juv. close by, then ran 2 or 3 steps at it, head low. 4:18, harem stopped & grazed. One prone 1 min., rubbed neck from side to side on grass, thrashed on side, rose. 4:27, ♂ appeared on hill top 100 yds. from harem, grazing. Two scars on lower right neck. 4:35, the 22 on hillside opposite, & 300 yds. beyond (SE), the ♂ of 6. Three of the ♀♀ moved 75 yds. further from ♂, to W. There were joined by juv. & other ♀ at 4:47, & all 5 walked to S. along and slightly up a rocky sidehill. The 22, 400 yds. from the harem, were being chased by a ♂ (of same group? - probably). 4:55, one, prob. ♂ of 6, grazing 100 yds. toward the 22 from harem. The ♂ of 6 grazed 50 yds. beyond harem, at equal level, & at 5:15 ♂ walked 50 yds. away toward the 22, some of which were crossing the slope 200 yds. beyond. 4 of the group of 6 in shadow of sunset. Strong W. wind continues. Juv. usually highest on slope, & ad. ♀ grazes near it. || 5:20, 2 of the 22 are prone, whole group in 100 yd. diameter. || 5:30, same, ♂ 100 yds. beyond ♀♀. || 5:35, the 7 (2 juv.) 50 yds. N. of road at km. 130 1/6. The 5 (0 juv.) in floor same draw as earlier. at km. 135 5/6, 9 (3 juv.) 100 yds. S. of road. I stopped on road, & lead. by one adult they slowly ran parallel to road in opposite direction from my approach.

November 23, 1951. at 8 a.m., km. 137 1/2, 8 (3 young), 100 yds. N. of bridge by road. They moved away when car stopped 150 yds. from them. at km. 138 1/6, usual 7 (2 young) 50' S. of road. They moved to 50 yds. from road as I drove past. The 5 (no Y) here were ^{on} mod. slope 300 yds. S. road, not down on their usual flat. The 6 (1 young) not apparent. I watched the 7 from 200 yds. Ad. ♂ below at 2 juv. which jerked away, one with tail up.

Vicugna

November 23, 1951

Huaylarco, 15000', Dpto. Arequipa

Of 7, one ad., not ♂, grazed 100' from others. ♂ prone but up in 2 min. 8:32, about 200 yds. W. of the 5, an adult ran down slope followed by small juv. 5 yds. behind, + a standing adult then followed 50 yds. behind, all going at a run for 1/4 mile + crossing road going N. of km. 138 1/6. One (♂?) of 5 took a stand 100 yds. toward the runners from the rest of group, then walked back to group. One lay one 4 of the 5 lay prone in 10' diameter. One defer. before lying down. Two yawned. 3 of the 4 lay on sides, necks on ground, within 3 minutes. The only grazing one apparently the ♂. In another 2 min., one (♂?) standing and others prone, necks up. Standing one prone again 1 min. later. 8:40 (8:40 a.m.). Fair W. wind; calm earlier. 8:45, the 7 staggered to pool + drank, then grazed near pool. The 5, 200 yds. S. of the 7, rose, + one (♂?) went out 50 yds., as ad. followed by young + another ad. (tail arched, probably ♂) ran up the slope near them (same 3 as earlier, back to near starting point). Apparently ♂ chasing single ♀ with young. 9:10, 1 of the 5 prone, + some of group only 100 yds. from the 7. 9:15, ♂ of 7 walked 50 yds. N. to road, across, then loped on toward group of 8 about 300 yds. N. of the 7 group. The group started to move away when ♂ 50 yds. away. 3 of the 8 about 50 yds. to one side of rest; ♂ toward them + they joined the 5 of group, + all went over hilltop. The ♂ followed. The territory of the 7 apparently crosses the road + goes ^{at least} to top of low hill 250 yds. N. of road. The remainder of the 7 remained grazing by stream bed. The 5 ad. were in same stream bed 150 yds. upstream. 9:23, the ♂ of 7 came back over top of hill at run, stopped, then on toward group, stopped, on again at run 100 yds. to edge road, stopped 15 sec.,

Vicuña

November 23, 1951.

Huaylarco, 15000', Depto. Arequipa

across road, stopped 75 yds. from harem for 15 sec., then walked toward group. 9:28, ♂ of 7 prone 75 yds. from grazing group, chewed cud. 9:32, ♂ of 7 up & ran past its head toward the 5 which were 125 yds. S. of the ♀♀. The 5 retreated as ♂ started for them. ♂ tail up, stopped 30' short of retreating group, then ran to feces pile & defec. The 5 rounded ♂ by 50 yds. & descended to creek bed 50 yds. S. of ♂ (200 yds. from the ♀♀ of 7 group). These ♀♀ walked 50 yds. E. together while ♂ away (♂ between them & the 5). ♀♀ of 7 group ^{next} to flat feces pile where ^{grass} 1" or less high. 9:45, one ♀ of the 7 def. & ur. on pile, squatting more deeply to urinate. 9:48, another ♀ def., same pile. 10 a.m., ♂ 50 yds. from ♀♀ of the 7 when a youngish ♀ (10-2 yrs. old) approached. ♂ ran quickly to harem. The stranger to 10 yds. & ♂ chased it 5 yds. away, then another 5 yds. The stranger ran past bunch & nervously ^{drank} ~~grazed~~ 50' from them. Then it ran into the bunch & 10 yds. out on other side, chased mildly. Repeated this. Then stranger off 50 yds. & defec. & urin., ♂ staying with band. Another run made close to band but mildly chased out a few yds. It stood 30 yds. away, then at 10:12 ran 200 yds. up slope to where the 5 (0 young) were. Three of them ran from it, then all 5 after it 30 yds. The stranger continued on at a walk and was not pursued. Territorial defense weak or nil against ♀♀!, at least young ♀♀. Tails occasionally flapped up & down, less sideways. 10:28, 2 juv. + 2 ♀♀ walked 50' from others. One lay on dusty spot & thrashed 2x, its back against 10' high dirt bank. Two others called there. An adult lay prone near streambed (10:30). Dried carcass of a vicuña by stream, & bones of another 100 yds. upstream. Prone ad. up 10:32.




Territories - November ~~25~~

Viciuana

November 23, 1951

Huaylarco, 15000 ft., Dpto. Arequipa

One juv. returned to main group. Other remained lying after rolling + returned to group 10:34. 10:50, one juv. defec. a few pellets. all graze near streambed 100 yds. S. of road at km. 138 1/2. 10:58, one walked to 4" deep pool, dipped arch of neck, lay prone in water, sunbathed neck from side to side in water, rose, shook body, shook head + neck, walked out. Others passed but did not bathe. ^{Both} One then lay prone on S. bank, tail tucked between heels, + others grazed near it (same one ad.; ♂, 50 yds. away). 11:02, prone one up, now muddy on legs. Compared to Arizona there is little resting - poorer frogs necessitate more time in feeding? 11:04, the ♂ crossed over to near group. One rolled on bare dusty ground, both sides, rose, shook dust out of body about + quick side to side short revolutions, somewhat doglike. 11:08, another rolled, shaking when ^{urinate} still on ground but hind legs up. 11:09, 2 more, + the last one, rolled on bare ground, one remaining prone to 11:11. The 5 now 150 yds. W. + 30' above the 7. Another rolled + remained prone 2 min. of the 7, 2 larger than others, so 3 apparently 1-2 years old. 11:25, the 7 now 200 yds. S. of road. ♂ walked 50 yds. from group + grazed at stream edge. One juv. + ad. ♀ defec. on pile (ad. also urin.). 11:28, ♂ went on to 50 yds. E. of streambed + defec. on pile. A juv. + 2 ad. ♀♀ defec. on same pile as previous juv. ♂ walked 75 yds. back to group after defec. A juv., walking 6' from ♂, put tail up + head stiffly high + back . 11:38, the 7 moved W. near streambed + were only 50 yds. from the 5 (2 prone) at slightly higher level on the slope. By 11:45, 3 of 7 lying on dusty ground near streambed, 3 within 100' of the 5 (2 prone). 11:46, a chest-chest-chest call + all up, the 7 running toward the 5 + the 5 away, but the chase proceeded scarcely beyond

Vicuña

November 23, 1951

Huaylarco 15000 ft., Dpto. Arequipa

leading individuals of 7, + the 5 ran 20 yds., then walked back to 50' from bunched 7. an ad-♀ of 5 def. + ur., then lay prone; + another. Evidently a territorial boundary tho no natural boundary. 11:50, the 7 moved w. together across slope, ♂ of 5 walking 11 and behind for 100'. The ♂ of 5 walked along 100' behind slowly moving 7. Only 1 of 5 prone (11:55); it rose, defec., then joined group. all 5 followed 11 to 7, ♂ leading. ♂ of 7 dashed 5 yds. at the 5, then cut back to own group. Repeated 1 min. later. The groups continued w. along contour to 150 yds. S. of Km. 138 marker (12:04). Nearly clear sky, intermittent fair w. wind. Groups 20 yds. apart. The 7 reversed course + moved slowly E., grazing, ♂ with group or in rear as if herding them. One juv. put muzzle near ad. ♀ head, then grazed by ad. ♀. The 7 grazed along for 50 yds. going E., then back to w., then to E. 12:15, ♂ leading, the 7 descended 100' across slope to stream bed + ♂ + others drank. Lips but not nostrils (further back) in water. Drank at edge pool or among some fist-sized boulders several inches back from edge rocky pool. all then grazed 50-70 yds. from car near streambed; 100 yds. from the 5 on slope to SW. Three of 5 descended to streambed, + 2 went to pool + drank (pool 50 yds. from other). 12:27, the 3 ran 100' across + up slope to rest of group. (from group of 9 or +) 12:40, a large adult ♂ from near the 5 ran toward the 7, which fled 100'; + stopped 50 yds. from them. Then it went to pile, def. + ur., + slowly walked downstream. It had 3 pairs scars on neck, symmetrically arranged as seen from front (lutea?). 12:50, one of 7 grazing 100' from parked car, near edge road. The 5 had gone 100 yds. back to E. 12:53, ♂ of 7 crossed to N. side road, the band still 50' S. road. By 12:55, all 7 across. 1:02, the 7 50 yds. N. road. Ad. + juv. def.

Vicugna

November 23, 1951.

Huaylarco, 15000', Depto. Arequipa

on pile, then other juv. on another pile. 1:07, ♂ def. same pile. Forefoot only 3" anterior to hind during d. + u. of ♂. (Several of groups of ¹² ~~400~~ 200 yds. S. of km. 138 are wet as if have bathed.) 1:13, one (♂ $\frac{7}{2}$) of 7 prone chewing cud. 1:29, ♂ rolled on one side, rose, shook body, nibbled at upraised hind foot, shook head, grazed, now 60 yds. from rest of band. A ♀ prone, rolled, rose, pawed once at ground, grazed. 1:30, in the East Draw, to S. of road at km. 138 $\frac{2}{3}$, the usual 6 (1 young) now visible. The 12, 250 yds. S. of km. 138, on gentle slope; 2 wrestled with necks, going down onto knees, then one clapped hindquarters of other from rear with forefoot, twice. # Seem to be 5 young in this group. # These about same place 2:10 p.m., & those (only 5 visible) in East Draw. // 2:20, 2 of 7 defec. ♂ moved pile & did wolf howl, repeated, then defec. on same pile. The 7 now 100 yds. N. of km. 138, working W. One juv. lying down (2:25). 2:32, the juv. up as ♂ walked past to join group moving W. 2:36, ♂ lay prone 50' E. of group, facing downwind (strong W. wind), but up 2 min. later. 2:47, the 7 turned back to E., perhaps because of strong headwind. An adult grazed alongside feces pile, tail raised (reaction to smell?). One juv. defec. on this pile, then ad. ♀. 3:10, ♂ of 7 walked quickly 50' to this feces pile & moved it, then gave wolf howl, this repeated 7 X in succession, 5-10 sec. nosing, head sometimes shaken as started up, & lips worked after head down to horizontal after howl. ♂ walked off without d. or u. Then ♀ juv., ad., & ^{other} ~~another~~ juv. (sex?) defec. on pile. Most again face into wind, still 100 yds. N. of road at km. 138 (3:15). 3:17, 2 more ♀ used pile. Movement after working flat on pile brings faces on part trampled by forefoot. 3:30, the 7 about 100 yds. W. & 100 yds. N. of the km. 138 marker, again working E. in grazing. About

Vicugna

November 23, 1951

Huaylarca 15000'; Dpto. Arequipa

km. 137 $\frac{1}{6}$, 200 yds. S. of road, the 12 (5 young), another adult 100 yds. from them, all grazing. The 7 worked 50 yds. E, then W., then E. by 3:55. Same 4 p.m. // at another spot a juv. raised from side, then shook its head quickly. At km. 137 $\frac{1}{6}$, 200 yds. S. road, a group of 5 with 2 young, one larger & darker than other ¹⁰⁰ ~~150~~ yds. from this group another 5 with 2 young. As latter group moved away from me, one young followed ♀ & put head under belly from L. side several times, trying to nurse. Perhaps all 10 in one group as some close together (4:15 p.m.).

November 24, 1951 At 9:20 a.m. watching 10 ♂♂ at S. edge road at km. 134 $\frac{1}{2}$. Clear, west wind. There on half vegetated thorn-bush flat. ^(Probably yearlings). 2 or 3 possibly old juveniles. Some 5 yds. from road edge. A truck passed; vicuñas retreated to 100' from road but back by road in 5 minutes. // Group of 6 and of 5 about 300 yds. N. of road on unvegetated ridge, & group 15 (all ♂♂?) 200 yds. N. of road at foot of hill rising from flat. // At least 2 of ^{one} 10 full grown adult ♂♂. No definite juv. Younger have longer hair, no lucid effect on side, shorter rostrum. By 9:45, 2 had d. & w. on one side at different times. The 10 were spread about 100 yds. One kept head down 3 min. in grazing. Another for 1 and 1 $\frac{1}{2}$ min. The look about takes only 2 or 3 sec. By 10:15 the 15 had moved $\frac{1}{4}$ mile W. along foot of hill. 10:28, one crossed to N. side road. ^{together,} Two ₁₁ were 80 yds. from nearest of bunch. // 10:39, group of 16 where the 15 had been earlier, & group of 19 (or +) about 500 yds. to W., also at very foot of hill. // 10:34, the one crossed back to S. side road. 10:37, one of the 10, tail up, ran across the road toward group of 16, 250 yds. away, but stopped 200 yds. from them & looked.

Vicugna

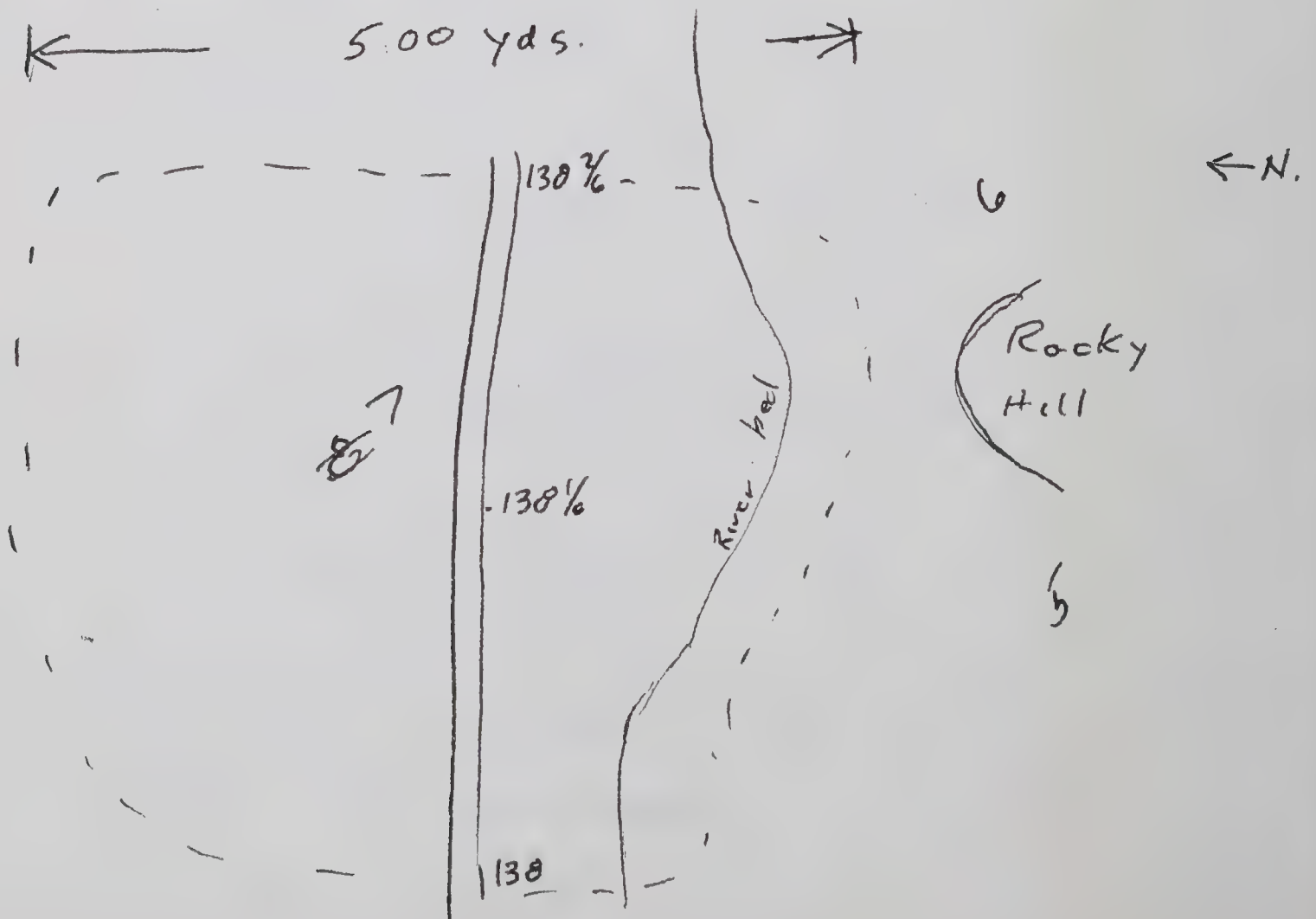
November 24, 1951

Huaylarco 15000', Dpto. Arequipa

10:40, the 19[±] reached the 16 + joined them. No chases tho one of 16 held tail up & retreated a few yds. & others stared at the new ones, then all grazed on flat at foot hill in one band. Arthur Williams has told me of bands of 100 + 150 - formed in wet season? Among the 35[±] a mild fight. One clasped rear of other in forelegs. Then head-to-head wrestling, each trying to put head under other's chest as if to trip forelegs while facing each other, & some sparring with necks high. One retreated & other followed, trying to trip hind legs leader with its head. Leader mounted rear of another but quickly down & away, still pursued. || 10:48 3 of 10 on N. side road. at least 3 of 10 rolled in last 3 min. Another across road 10:55. || The 35 spread to S. toward the 10, & at 10:58 one of 35 walked (ears up) to 10' from one of 10 (ears back). No reaction, but another of the 10 ran 10' at newcomer & latter retreated 5 yds. The 35 spread 200 yds., 2 lying down. || The Williams remarked on the few young left in groups by end of season. This partly due to young ♂♂ leaving & joining ♂♂ bands? || One of 19 ears back, made throaty crow-like call 3x at one 6' away, latter facing away, ears back. 11:05, one of 10 lay prone. 3 of 35 are down, 2 rolling. 11:08, the last 6 of 10 crossed road toward the 35. || In the distance, estimated 200 yds. N. of km. 13 3/4, a group of 20[±] - so probably 65 ♂♂ within 1 mile of this flat. || The 10 seem to have joined edge of 35 peacefully. I drove 50 yds. toward the group, & at 200 yds. distance all took flight & ran to foot of hill to N., some ascending 100', others remaining on flat at foot. Several defecated at foot of hill (11:15). All slowly grazed w. along lower slope. 11:30, all ran 50 yds. uphill quickly, then stopped (top of vegetation), then ran again across & up slope to

$$\begin{array}{r}
 330 \\
 500 \\
 \hline
 16500 \text{ sq. yds.} \\
 \hline
 43564 \overline{) 1485000} \text{ sq. ft.} \\
 \underline{13068} \\
 17820 \\
 \underline{17424} \\
 \hline
 \end{array}$$

rectangle 500×330 yds. = 34 acres (horizontal)



Vicugna

November 29, 1951

Huaylarco, 15000', Dpto. Arequipa

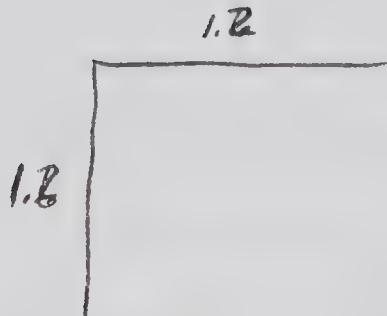
top of hill (100 yds.) on vegetationless loose soil. about $\frac{1}{2}$ to 1 mile to W. I saw 3 other groups, about 20, 10, & 5, running N. across the road toward hills. Similar movement seen near km. 130 about 2 days ago. Perhaps explosion from Volcan Ubinas, ^[probably dog to 5.] inaudible to me, disturbs them. I was 400 yds. from nearest; ^{other or people} no cars in area. I drove to km. 132 but saw none, either side of road, except 10 \pm crossing a barren hill 1000 yds. S. of km. 132. On a greenish flat ^(S. 133 Flat) S. of km. 133, large free pile, some 12' diam. and 1 foot deep. || 4:20 p.m., 4 (2 ad. + 1 juv. + 1 yearling?) 300 yds. S. of road at km. 137, at foot of hills. 4:30, km. 138 $\frac{1}{6}$, the usual 8 at streamside 150 yds. S. of road, & the usual 5 ad. in West Draw 400 yds. S. of road. Strong gusty W. wind; sky clear. The bunch ^{of 7} quickly walked to 100 yds. S. road. By 4:45, the 7 50' S. of road. a ♀ def. & ur. The ♂ immediately walked to the pile, nuzzled it & did wolf howls, worked forefeet on pile, then d. & ur. 4:52, one spitting at another 6' away, receiver standing stiffly facing away, spitter with nose high. Then the 2 juv. d. & ur. in turn both ♀♀. Led by ♂, all ran across road to N. side. and grazed 100 yds. N. of road on mod. S. slope. The group grazed 50 yds. to W., then back to E. One spit visibly a diffuse white spray at head of another ^(not juv.) which walked 4' from it (5:10). 6 grazed 50 yds. W. again then ran back to E. together. 5:18, all walked 100 (or +) yds. SE, out of sight over crest of hill. Then 300 yds. S. of km. 138 $\frac{1}{6}$. || 5:30, climbed hill & saw these 7 in shallow sheltered draw 350 yds. ^{N?} S. of km. 138 $\frac{1}{6}$. || 5:45, km. 137 $\frac{1}{6}$, 9 ♂♂ at road, no young. || Opposite is rough sketched territory of group of 7 (2 young). About 3 acres occupied.

$$2 \text{ km.} = 1.2 \text{ mi.}$$

$$1 \text{ mi.} = 80 \text{ ch.}$$

$$1.2 \text{ mi.} = \cancel{128}^{96} \text{ ch.}$$

$$\begin{array}{r} 96 \times 96 \\ \cancel{128} \times \cancel{128} \end{array} = 9216 \text{ sq. ch.} = 921 \text{ acres.}$$



$$\begin{array}{r} 128 \\ \cancel{128} \\ \hline 1024 \end{array} \quad \begin{array}{r} 96 \\ \cancel{96} \\ \hline 576 \end{array}$$

$$\begin{array}{r} 256 \\ 128 \\ \hline 16384 \end{array} \quad \begin{array}{r} 864 \\ \hline 9216 \end{array}$$

Vicugna

November 25, 1951

Huaylarra 15000; Dpto. Arequipa

3:15 p.m., km. 136 $\frac{1}{6}$, a group of 20 ♂♂ 300 yds. S. of road grazing on rocky slope below old corral. 5 may be yearlings. ^{up in 5 min.}
 9/10 alto-statured overcast, strong W. wind, not cold. 3:19, one prone. Do
 ♂♂ in ♂ hands do "wolf howl"? 3:24, two def. on pile in turn. ^{& ur.}
 walk away, tail out for 15 ± sec. 3:26, another def., then another, then
 another (3:28), last taking 45 sec. for time hind feet spread. 3:36,
 one d. & u. same pile in 25 sec. Group moved slowly about 50 yds. E.
 3:53, several looked to E., then all ran to ^{N.} together, up a slope, across
 road, & 100 yds. further up rocky moderate slope. No apparent
 cause for alarm. 3:58, after standing 3 min, group ran 100 yds. W.
 across slope, then further uphill. Reason? A man leading llama
 coming down streambed; at least 500 yds. from vicuña at first alarm.
 // I drove to km. 138 $\frac{5}{6}$ where group of 3, youngest a yearling ^{? (not juv.)}, grazed
 at foot of slope 150 yds. S. of road. 4:16, ♂ d. & u. on pile. All 3 within
 50' ~~distance~~ space. 4:23, youngest grazed m. ♂ & ad. ♀ lay prone on slope
 20 yds. away facing downwind. Ad. up. 4:35, 4:40, the youngest d.
 & u. - a ♀. Then ♂ walked & others followed, then ran slowly
 to N. & across road (no apparent alarm). 4:45, the 3 grazed 100 yds.
 N. of road at km. 138 $\frac{4}{6}$. Same at 5 p.m. Territory of the 3 probably
 joins that of the 6 & 7 on W. side. At 5:03, km. 138 $\frac{1}{6}$, the usual
 5 in the ~~W. Dr.~~ W. Draw, 500 yds. S. of road. at 8 p.m. they were
 on a low hill 300 yds. near road. 1

November 26, 1951. Cold night. 9/10 series. Little breeze by 8 a.m. at
 km. 133 $\frac{4}{6}$, group of 15 at S. side road at 7:50 a.m. I watched.
 They walked to 100 yds. away from road when car 300 yds. distant. ♂
 stand at me, 50' from others. Then ♂ prone. Estini. 5 juv., one paler
 & paler than others. I watched from car 300 yds. distant. Group

Vicugna

November 26, 1951


Huaylaraq 15000'; Depto. Puno Arequipa

on sandy-gravelly flat, 300 yds. from foot nearest hill, where ground cover 20% of short grass + stunted crooked thin bushes. 8:03, ♂ up. One gave 3 thin whistles, descending in pitch --- a half note each time, steering my direction. All grazed in 20 yd. diam.; ♂, as ^{some} others seem, has 3 concavities at side neck, lowest just above hilt, highest at outer neck, other between - scars? glands? Heat waves bad. ♂ lifts hind leg out & noses under abdomen, then rubs lateral side hind leg with metatarsus of opposite leg. ♂ seems bigger, thicker necked & muscled, than others. Black penis area visible in front quarter view. 8:15, 600 yds. SW of the 15, a herd of 11 on green flat where large feces piles (about 500 yds. S. of hem. 133). 8:23, a ♀ prone. ♂ raises head to belly level & looks for 3⁺ sec. every 15-30 sec. 8:30, a lone one had approached the for 11; now they moved 100 yds. out onto nearly bare ground (chased by the 1?). At a sneeze from me, 3 warbling whistles given by 1 of 15, then all walked 100 yds. away. ♂, youngest juv. (perhaps only juv.), & another defec. on one pile in turn, then another. I drove up to 300 yds. from group. again whistles from me, & all moved off to W., ♂ 50 yds. separate & watching me. I drove up onto small rise - more whistles; group moved to 500 yds. away, ♂ separate from others. This brought the 15 about 100 yds. from the 12. Another group of 6, 1/4 mile to S. of the 15, ran across dry lake bed for 300+ yds. 8:45, ♂♂ of the 12 & 15 fought, racing about & raising dust. Then stood apart & back with groups 8:50. One of 15 def., moved pile, worked forefoot on it, turned about & urinated. The 15 & 12 about 50 yds. apart. 300 yds. to W. of the 12, group of 7 (those that crossed lake bed?). By 8:59, 8 of the 15 prone or on sides, then 9. ~~3~~ 3 pairs lying together. Of the 11, only 1 prone. I walked about, 600 yds.

Vicugna

November 26, 1951

Huaylarco 15000', Dpto. Arequipa

away, & all prone rose. I sat still + 2 prone within 3 min. ♂ of 12 made dash at 15 + ♂ of 15 retreated to its group. When ♂ of 12 retreated ♂ of 15 followed, tail up, + chased a few yds. ♂ of 12 remained 10 yds from 15; the 15 retreated 30 yds. to N. of it. Two main groups 150 yds. apart (9:08). ♂ of 12 chased ♂ of 15 around its group + back into it, very fast, then stood 20 yds. away. 9:12, 3 of 15 prone within 1 min.; 2 more by 9:14; 6 by 9:15. About 6 (not incl. ♂) of 15 wandered toward the 12 ♂ + it chased them back to group. 9:17, 7th of 15 down, then 8. 12 ♂ stands between groups 100 yds. apart. 9:20, 9 of 15 down (1 of 12). 11 of 15 down 9:21; 13 9:22, about 5 flat on sides. 9:23, one of the 12 nursed at L side rather for $1\frac{1}{2}$ min. or t. ⁵ of the 12 down by 9:24. 9:27, only 1 of 15 still up. ♂ of 12 back at own group. One of 12 chased another back into group; ♂? - tail up. At this action all but 2 of 15 rose, but 4 down by 9:31. Two of 15 def. 1 pile. One of 12 lay on side all 400 yds. from nearest hill on sparsely grassed plane. 9:38, only 3 of 15 down, others grazing about 100 yds. S. of km. 13 $3\frac{1}{6}$. ⁵ 4 down 9:39. One def. on pile. All 15 up, only 100' from the 12 (9:41). One defec. One youngster in running to main group with others held head pulled way back . One youngster one of 15 naved pile + did wolf howl twice (juv. ♂?). 9:50, 12 + 15 moving S. slowly, parallel, 100 yds. apart. Alarm call + looking ^{past} my direction, then grazing. 10:00, the groups looked S., then both groups ran to N. 100 yds. About 1 mile to S. 3 dark spots, perhaps dogs. Groups grazed. 10 + defec. 10:19 one of 15 prone. A youngster of 12 walked up to 10' from same youngster of 15, stood $\frac{1}{2}$ min., then ran back to its group with head pulled way back + tail up + forward. 10:12, 10 of 15 lying down. Then 3 up + 1 down again. Then 11 down of 15 (10:15).

Vicugna

November 26, 1951

Huaylarco, 15000 ft., Depto. Arequipa

12 down 10:16, then 13. 2 of the 12 were down. Then 3 of 15 up. No move when car passed on road 100 yds. away. Then 7 up by 10:22. 3 of 12 down. Only 6 of 15 still down at 10:31. Wind fair + intermittent. 10:40, the 6 prone of 15 were 100' from grazers. 2 prone of 12 were 50 yds. from grazers. 10:45, only 4 of 15 still prone. 10:53, 3. 154, 2. 156, 1 - but another prone at opposite end group. Then first up. Group spread 50 yds., 100' S. of road. 10:55, the one up + 3 others down. The 2 prone of 12 rose + grazed toward their grazer. Then 5 down of 15; then rolled + ran (10:59) + walked to grazer, now working S. on flat. 11:30, one of 15 defec. on pile. The 12 were 200 yds. W. of 15, + 7 300 yds. further on near base of low hills. One of the 12 walked 50 yds. to large feces pile + defec., then grazed near pile. One of 15 defec. One pawed ground with 1 front foot then seemed to feed at spot - uncovering food? One of the 12 nursed. The 12 + 15 scattered, some of the 2 groups only 100' apart. 11:50, 5± of each group rolled, raising the dust. After rolling some stayed down 5± min. before rising. The 12 + 15 100 yds. apart at 12 M. Sky 4/10 thin cirrus. Fair W. wind. One of 15 nursed (not youngest so 5± juv.) for 1½ min. or + at R side mother, mother standing with ears back. Then mother walked + juv. head rudely forced away. Mother rolled. Juv. walked away. 12:05, two (app. not ad. ♂ or ♀) ran slowly 300 yds. NW to the 15. The ♂ stood 10' from them between group + the 2, tail up. after 30 sec. the 2 ran off to S. + ♂ followed slowly. The ♂ of 12, 200 yds. away, ran at the 2 + chased them 100 yds. when the 2 stopped, 12 ♂ chased again. 15 ♂ stood 100 yds. away. Then ♂ or ♀ returned to grazers. Then from near me, following route of the 2, 36 trapped by on the run, including several juv. Prob. all ♂ or ♀. They went directly to the 15 + joined with

Days probably displaced some from a distance

Vicugna

November 26, 1951

Huaylarco 15000', Dpto. Arequipa

them. Then a scramble for 10[±] min. as ♂ of 15 chased various ones without much effect. Finally the 36 across to N. side road near km. 133 marker. The 7 to W. had become interested & worked toward that spot, & the ♂ of 7 attacked the 15 & drove them 200 yds. W., then returned to its group. The 36 remained scattered along foothills for 200 yds., 100-200 yds. N. of road. Part of 7 crossed toward them, then returned to our side (S) of road nr. km. 133. The 12 took no part. The 2 apparently belonged with 36 & joined them. Another group of 10 crossed lake bed 200 yds. S. of the 12 & traveled about 1000 yds. W., then grazed at green flat at foot sandy hills. At 12:30, then, 38 scattered to N. of km. 132½-133, 7 100 yds. S. of km. 133, 12 ¼ mile SE of the 7, 10 600 yds. S. of 7, & 15 by road 200 yds. W. of km. 133. I drove to nr. km. 133. Of the 12, about 4 juv. The 15 crossed to N. side road near the 38. The 7 climbed low sandy hill from greenish flat onto nearly low sand. The 15 did not cross crest of a rise 300 yds. W. of km. 133, but I drove over crest to watch leading 30 of the 38. On bare ground food found by pawing. Toes spread, pawing back in long ~~stroke~~ stroke 2 or 3 X, about ¾ sec. per stroke, sometimes with one foot after other so wider groove formed. Definitely juveniles in the ♂ band, about 8 of 27, ~~possibly 10!~~ I drove back toward km. 133. Of 21, 7 juv. I got out of car 250 yds. from the vicuñas & they ran up slope in a big bunch. One ♂ in bunch soon began herding others about, & after 5[±] min. the group had moved back nr. km. 133 & was divided into 2 groups of 15, the herding ♂ having 1 small young in his group (the 15 of earlier?) - but, 2 nursing of the remaining 15 (2-4 other juv.). Evidently new group ♂ & ♀ mixed with others - poss-

Vicugna

November 26, 1951



Huaylara 15000 ft., Dpto. Arequipa

ibly part of the 38? The ♂♂ further to W. fled to N. of road
 nr. km. 132 1/2. 1:35, a group of 11 walking SE onto flat from
 km. 133, to area where 15 this morning (the 15 groups?), + 100' N. of
 the road one, ^(♂ of 1) tail up, driving 4 (~~remainder~~ ^{remainder} of 15) off to the E.
 while 14 (¹¹ of ^{morning} 15 group?) grazed 200 yds. E. of km. 133. The
 4 driven nearly to km. 134 before pursuit ceased, then chased (♂?)
 stopped + the 4 crossed to S. side road. The 11 which had crossed road
 went ^{600 yds.} 1/2 mile S. of it, 400 yds. E. of the 12 on flat. The 12, now 400
 yds. E. of car, have 4 apparent juv. 1:50, 5 prone of the 11; these 11 on
^{high water} ~~old lake~~ bed where slight vegetation. The ♂ N. of road remained 300
 yds. W. of km. 134, & at 1:50 the 14 started toward him at steady walk.
 The 4 which crossed road now grazing 150 yds. S. of it. By 2 p.m.
 these had gone on to 300 yds. the E. side of the 11, the one having fall-
 owed 300 yds. S. of road. One of 4 ran 200 yds. ahead of the oth-
 ers, toward the lake. All of the 11 up at 2 p.m. The 4th ran back
 to 3 (2:05), then all ran N. at steady pace, past the one that had fall-
 owed, for about 1/2 mile, then they met a running group of 16± heading
 W. The 16 veered to N. across road + the 4 followed (about 1/2 sec. per
 bound in running). The 20 continued on to base of hills 300 yds.
 N. of road, then one of 16 gave chase to the 4. The 4 then ran ahead of
 the 16; all climbed the rock + dirt escarpment to top (2:10). The ♂(?)
 which originally followed the 4 did not chase them back to N., but at
 2:10 it was 100 yds. ^(all 15 together 2:15) from the bunch of 14 just N. road at km. 133 1/2.
 The 11 had moved 200 yds. N. to 300 yds. S. of road by 2:15 (10% vegetation
 visible). 2:15, the 7 which were nr. km. 133 at 12:30, now 1/2 mile
 to SW on same greenish flat. The 10 had gone that way + then over
 dunes toward vegetated hills about 1:15. Strong W. wind, 1/10 cirrus

Vicugna

November 26, 1951.

Huaylarico, 15000', Dpto. Arequipa

clouds to E. Of the 11, 4 juv. One holds tail  stop back when 6' from 07. One of 12 grazes 100 yds. from others, toward the 11 (300 yds. N. of 12). 2:28, this one ran 100 yds. toward the 11 & they moved N. at a walk. The 07 of 11 came no closer but grazed 200 yds. from its group. 2:38, 07 walked back to the 12 as 3 of them seemed to stare at (a fox?) - 110, rolling black object pushed by wind. One of 12 nursed, left side, juv. behind & to side mother . Then mother walked away. Juv. followed trying to get head under abdomen. When mother stopped juv. nursed between her legs from rear for 10± sec. One of 11 prone 2:38. 2:45, 07 of 12 led group 200 yds. toward 11, 07 100 yds. in lead & others in close file. 2:55, ad. of 11 defec.; 2 are prone, 3:01, another prone. Ad. walked to the 3 prone & they up, last (juv.) with tail up & a rump, head back. Then 2 prone again. 3:07, ⁴/₇ incl. juv., def. on same pile in turn! ^{were} 5 prone, then 1 up, then 5 of 11 prone again (3:09). 3:11, all of 11 walked slowly NE, not in file, for 200 yds., to close to where 15 first seen this morning. Other group of 15 are 250 yds. to N., ^{100 yds.} across the road. The 12 ^{were} scattered 200± yds. One of 12 prone since about 3:15. 3:37, 07 of 12 ran past group & toward the 7, 1/2 mile away (W.), putting on much speed at end. The 7 started away when 12 07 200 yds. from them, & they ran onto slope of low bare hill & raised much dust in fleeing. 3:42, 07 halfway back to 12. It made another foray after the 7. The group walked 200 yds. toward 07 by 3:55, & on another 300 yds. by 4 p.m. (on 07). 3:57, the 15 N. of road cross toward the 11, 07 leading 25 yds. The 11 retreat at 200 yds. distance and 07 of 15 runs 100 yds. toward them. (all 07 07? - the 11 for displaced ind.) (possibly the 4 were all 07 07) & the 15 the ones in area this morning. 4:04, the 15 500 yds. S. of road - Two of 11 wrestled with necks, later reared & clashed (suggested 07 07).

Vicugna

November 26, 1951

Huaylarco, 15000', Depto. Arequipa

The 12 + 7 graze 100 yds. apart, ♂♂ 10-20 yds. toward each other from bunches (4:10). The 15 kept on & passed 200 yds. W. of the 11 (stopped), then on 200 yds. to flat shore of the lake (first reached 4:07) where they drank. at 4:12, 3 of the 11 approached lake shore 100 yds. from the 15, & drank - 8 of 11 there at 4:13, others 3 coming. 4:14, the 15 started N. away from lake; 2 lay prone on dry ground at lake edge but soon up. 2 others (of 15) lay prone 100 yds. from edge lake. One small pale young in this bunch 15 (are there ¹⁵ ~~probably~~ same as seen here this a.m.?). The youngest 3rd. in file. 4:17, prone over up - all 15 (+ the 11) file N. from lake. Two pairs of 15 have mild fights, tripping legs. In tripping from rear in running, following one (tripper) holds neck very stiff so that head bobs up & down in running. The 11 went 100 yds. up a hill to E. after leaving lake. The 15 paused in bunch to graze 600 yds. S. of road on lake flat. The 7 have retreated to W. so that 12 + 7 300 yds. apart on same greenish flat. Same 4:30. The 11 about 300 yds. E. of tip of lake.

November 27, 1951, about 8:30 a.m. saw 7 about 100 yds. ^{N.} E. of road at km. 138 ²/₆ (the usual 7 prob.). about 3 p.m. then 7 near mouth of (E. 138.2 Draw) West Draw & the 5 about 200 yds. beyond. At 3:25, 15 150 yds. N. of road at km. 133 ⁴/₆ - prob. same 15 as yesterday afternoon. 5 ^{juv.} ~~same~~ Strong W. wind, sky ¹/₁₀ cumulus. One juv. smaller & paler than others. No others visible on 133-134 - lake flat. Territory size, yesterday; about ¹/₂ x ¹/₂ mile rectangle, ≈ 160 acres. The 15 went ¹/₂ mile to lake for water in one trip, & from km. 133 nearly to 134. 4 p.m., at least 4 of 15 rolled. Apparent ♂ grazes 20 yds. from gathered bunch. About 100 yds. further E. by 4:25. I moved car, 300 yds. from grass, for

Vicugna

November 27, 1951

Huaylarco, 15000'; Dpto. Arequipa

better view - all heads remained down except ♂. after 2 min., it gave alarm chirp 3-4x, then further 6 ran to bunch + all raised heads. 1 min. later ♂ grazed. Group 100' N. of road, 150 yds. W. of km. 134. 5 p.m., at N. side of road 100 yds. W. of km. 134 mark. Grazing on flat gravelly ground with 10% cover, but feeding between the short spreading grass clumps where nothing visible with 20x telescope at 250 yds. Strong wind continues from W. about 7 def. & ur. on 1 pile in turn at 5 p.m. Then group worked W. again. Heads to ground as they move along, seldom over 5 sec. without taking a step with 1 foot or ^{any} the other. 5:30, 50 yds. N. road, 150 yds. W. km. 134. ♂ a little separate from rest. Sunset 5:45. Wind died. 6 p.m., group 100' N. road, 100 yds. W. km. 134 past. Grazing steadily. 6:07, (after I moved 50 yds. toward) group, ^{led} by apparent ♂, walked & ran to N. for 300 yds. to foot of hills. There leader grazed 10 yds. up the slope while others stood in dry river bed. About 5 engaged in running around & in playful battles, often rearing up high on hind legs facing another doing the same, sometimes remaining up for 1 or even 2 seconds, then dashing off after another for 100 yds. Because of darkness I drove to road edge to see. at 6:15, group started N. up the slope, out of vegetation, over rocks, & to loose barren dirt of crest of hill, 150 yds. above bottom. Silhouetted on skyline, they walked along, & 2 reared up at each other in playful fight. Then they disappeared over crest (6:20 p.m.). Stars then visible.

November 28, 1951. Driving E. over summit 6:45-7 a.m., noted 1/3 or more of some groups lying prone, perhaps at or near night bedding spots, on slopes, some among boulders. At 12:50, saw the bunch of 15 at ft. of hill 300 yds. N. of km. 133 4/6. There soon went

Vicugna

November 28, 1951

Huaylarco, 15000 ft., Depto. Arequipa

W. into mouth of draw N. of km. 133 $\frac{2}{6}$. A group of 6 seen $\frac{1}{2}$ mile S. of km. 133. No others visible from road in km. 133-134 area (1 p.m.)

1:05, 50 yds. S. km. 136 east, 3 (1 a yling? 2 ad.) at stream bed.

at km. 137 $\frac{2}{6}$, ^{7:15} 3 $\frac{1}{2}$ (2 juv.) 200 yds. S. road on rocky flat. Km. 137 $\frac{3}{6}$, 300 yds. S. road, 16 (5 juv.) on flat short grass slope at foot rocky barren hill. One ^{was} prone; rose (1:15). I watched the 16. ^{prob. ♂} 7/10 cumulus; fair wind; not cold. 1:25, 2 ad. ♀♀, 3 juv. (107?, 1♀, 1?) defec. ^(some) & ur., all ^{but one} ~~on one pile~~ on one pile, this one 5 yds. distant. 1:27, ad. ♀ defec. only, same pile or near. 1:33, 4 juv. Together. One put head low & other put its neck over low neck; this repeated - playful fight between juv. 1:35, juv. def. & ur. - prob. ♂. Ad. ♀ def. & ur., the thick stream stopping & starting every second ±. 1:45, the bunch on nearly bare ground at foot hill, having moved 50 yds. E. One ^{ad} lay on side, feet together, neck up - then prone; 1:49, this up & juv. on side. Juv. up 2 min. later. 1:55, group spread 100 yds.; 1 ad. prone - rose in 2 min. after rolling.

2:03, a juv. defec. on pile, moved pile, gave wolf howl shaking head & stretching neck up at end; then def. or ur. again, walked off. Prob. ♂. 2:10, one lay on side, then 2 more. Apparent ♂ a little separate from rest - about 20 yds. Then 2 more down, a juv. rolling. Only 1 still down 2:13. It up 2:34, & another on side. 2:37, another & prob. ♂ down. 2:45, one up. One resting tip chin on ground in front of body. 2:48, ♂ rose & walked to group. Other rose. Then 2 juv. & 3 ♀♀ defec. & urin. About 5 rolled. One juv. nursed at R. side mother for 1 min. or +. Then all walked S. 200 yds. into mouth shallow draw. 1 or + defec. there, then all grazed (3 p.m.). I then watched the 7 (2 juv.) 200 yds. S. of 137 $\frac{2}{6}$. Tips ears juv. very light color. Bib of juv. pale yellow brown compared to near-white of adults. The group, led by ♂, moved 50 yds. Nearly

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all ralled in dusty area. Standing juv. put neck against ~~that~~ that of prone juv. & reared a bit. Prone one up. One juv. tried to put head under belly of other. Other reared & put one foreleg over back of other, then the 2 dashed off in a short chase || 3:18, 100 yds. N. of road at km. 137 $\frac{3}{4}$, a group of 8¹⁰ (4 juv.) grazing on mod. slope. No wind; $\frac{7}{10}$ cumulus. The σ^7 100' downhill, toward road, from nearest other. Line of back perhaps straighter than \varnothing \varnothing from shoulder to rump. As σ^7 walked 10' from juv., juv. pulled tail up steep rump, pulled neck back in 2, & walked slightly crouched. Again, & this time went down onto wrists & knees, but up again. Again tail up & neck S-ed when juv. walked 10' above σ^7 . Ad. \varnothing gave short quick kick back as σ^7 juv. walked 8' behind.

3:45, the 10 at crest hill, at least 2 prone. || 3:50, km. 138 $\frac{1}{4}$, a group of 10 (2 juv.) at foot of slope 300 yds. S. road near mouth of West Drain in the 7 territory, the 5 not apparent. One prone. 400 yds. W. of the 10, about 400 yds. S. of km. 138 mark, a group of 8 (3 juv.), 4 prone, bordering territory of the 5. I watched the 10. The one up 4:00. 4:09, ad. \varnothing def. ^{on pile}. Another ad. def. ^{only} on same pile. A juv. grazing at edge of pile held tail up & let a few lobes fall. 4:20, 2 ad. \varnothing d. & w. on same pile. 3 kept 20 \pm yds. from the other (with young), & at 4:24 one of the σ^7 ran 10 yds. at one of the 3, then returned to group. The chased one retreated a few yards & another of the 3 ran a few yards after the chaser. One of the 3, apparently a σ^7 , walked 100 yds. W. of the bunch. Perhaps the 7 are the usual 7 here (2 juv.), the other 3 intruders or part of the 5. 4:32, a σ^7 of the 7 walked forefoot 16X on pile before turning to d. & w., then trotted toward 2 (of the 3) about 20 yds. away but stopped when saw the other σ^7 (?) returning. The 3 & 7 100' apart at 4:40. $\frac{2}{10}$ cumulus, light breeze. || 4:45

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the 16 watched earlier were 250 yds. up a slope to SW of where last seen. At km. 136, a group of 10 below the coral 300 yds. S. of road.

November 29, 1951. At 11 a.m., the 15 about 100 yds. N. of road at km. 133 $\frac{4}{6}$, no others visible in vicinity. At km. 137 $\frac{4}{6}$ (bridge), 10 (4 young juv.) 100 yds. to N., as seen near there yesterday. At km. 137 $\frac{5}{6}$, 9 100 yds. S. road, 4 being juv.; near water + grass in bed creek. Similar group seen 300 yds. S. road here yesterday afternoon.

11:30, at road at km. 138 $\frac{4}{6}$, in territory of former 7, ¹¹ ~~10~~ (4 juv.), in loose band (ad. ♂?), 200 yds. to S. The 9 out of creek bed + 200 yds. to E. (S. of km. 138) - one juv. mounted another from rear + laid head alongside other's shoulder - then off. I watched the 11. Two minor chases within group by 11:45, & all 50-150 yds. S. road then. All in creek bed 100 yds. S. road at 12:00 after I drove by. About 4 drank in small pool. Up the W. Draw, where formerly 5 ad., now only 3, these wet as if from bathing. Occasionally 1 of 11 rolls on soil or grass. Grazing on stream plain where thick bunchgrass. 12:25, 1 prone + chewing cud; adult - up ⁱⁿ 2 min. This last 50' from others + occasionally 1 or other face it tail up. As there in 7 territory, the 11 prob-
[decreased to 4 at 25 next day - this 11 another band?] ably increment of the 7, addition possibly from the 5 or 12 in adjacent territories. After rolling some lay prone or on side for up to 5 min. // 12:40, the 9 were 300 yds. S. of km. 138 where seen yesterday afternoon. // One of the 3 chased the 9 back toward road, going about 400 yds. from its group to do so, returning to them 12:48. 1:20, a juv. walked 50' to fence side, raised it $\frac{1}{2}$ min. but did not def., then walked back to group. It put head close to that of an ad., juv. tail up, & head gave a little jump

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 up, half rearing. Then juv. walked away. 1:40, 2 juv. def. + ur.
 one sure 1 apparent ♀. One then defec. on pile. One juv. defec. (+
 ur. ? - ♂ ?) on pile 50' distant. An ad. ♀ def. + ur. on first pile.
 Some chase of a few steps by ad. at young. One ad. grazes
 100' from band - seems a ♀, not welcome. One juv. put neck over
 back of an ad. without reaction from adult. All overcast; fair
 E. wind. The 11 + 3 about 200 yds. apart, the 11 now 250 yds.
 S. road on slight gull slope. 1:48, a ♀ juv. d. + ur. on fecal pile. Then
 an adult def. only. 1:50, the separated 11th ran to fecal pile 100 yds.
 from the group but did nothing as it, & the others, were looking
 toward approaching 3. The apparent ♂ of 11 stood with tail out &
 occasionally snapped both ears ^{back} ~~back~~, then erect again. 2 of the 11
 & 1 of the 3 (150 yds. SW of 11) lay prone. The separate one of 11 grazed
 75 yds from rest of group. 1:55, 2 of 3 prone. 1:58, only 1 of each group
 prone. 2:00, 2 of 11, both juv., prone. Older juv. with distinctive white
 tips to ears. 2:04, on juv. up. 2:10, last of 11 up, & the one of 3 up. 2:15,
 white tipped eared juv. advanced, tail up & neck in S, stiffly toward separ-
 ated one of the 11. The ~~sepa~~ when heads almost touched, the ad. seem-
 ed to blow at juv., then ran into group, & an ad. of group, tail
 up, ran to where ad. had been. The 3 now approached &
 the one of 11 which had been separate went 10 yds. toward them,
 so perhaps ^[- prob. ♀ stranger] ♂. One of the 3 advanced, & ^{the two} ~~2 others~~ stood 10 yds.
 apart, tails raised. No chase or fight & both groups grazed &
 moved along sidehill only 50' apart. Territorial boundary? One
 ad. of 11 defec. One of the 3 ran 80 yds. ahead of its group & defec.
 (2:22). All working NW along hillside. 2:30, ♂ (of ?) of 11 ran
 100 yds. E. of band, back to former grazing spot, & d. + ur. on one

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free pile, then visited & moved another. This one paler than about 3 ♀♀ of band. It grazed 100 yds. from rest. 2:45, this one ran back toward the 3, tail up, & 2 of the ♀♀ also ran, tails up, toward the 3, & then stopped 50' short of the 3 & soon grazed, the ♀♀ retreating further from the 3. Closest of the 11 + 2 (♂♂?) only 20' apart.

2:53, one of 11 defe. One of 3 prone, a second at 2:58. 3 p.m., the juv. with white tipped ears tried free pile, moved it, gave wolf howl, then def. & ur. - a ♂!, & distinguishable from other young in this group. Two of 11 prone 3 p.m.; one up 3:07. 3:10, warbling whistle from 1 of group, then stalling (not all same way). Eventually the 2 prone of 3 rose. more whistling. Then alarm subsided. a juv. - defe.; ♀?. Then throaty squeals - the 2 ♂♂ had been 5 yds. apart; one chased other 200 yds. along sidehill, squeals repeated again & again, & then chased one pursued other back, & both stopped 5 yds. apart about 100' from respective groups. 3:15, 2 ♀♀ of the 3 were prone, & ad. & juv. of 11 prone. ^{up 3:24.} 3:21, another juv. of 11 prone. ♂ of 11 defe., then loped up slope to 20 yds. from ♂ of 3, stopped & grazed. 3:26, one of prone ♀♀ of 3 up, other 2 min. later. 3:32, ♂ of 11 ran a few steps at own hand & moved them farther from the 3. Juv. up - tail up as it walked across in front of ♂. An ad. of 11 lay prone. There were whistling without apparent reason. Then ♂ (rough hair of scar on left side center neck) led group 100 yds. N., to edge stream bed. ♂ lay prone 100' from group. A ♀ of 3 def. & ur. 3:45, ♂ of 11 up & all followed 50 yds. behind toward road. ♂ turned back to 100' from road as car passed, then crossed & grazed on N. side while group grazed on S. side. The 3 remained at same site as before. 3:50, all but 2 across road. A ♀ juv. stopped to d. & ur. 3:51, last

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 across. The group then grazed 150 yds. N. of road on slope at
 mouth of small draw - where I had seen the 7 graze on previous
 occasions! (4 p.m.). atop hill 300 yds. S. km. 137 $\frac{5}{6}$, 9 (3 or 4 juv.),
 ad. bided back at head of juv. class behind. 6, 1 juv., about 600 yds. S.
 [E. 138.4 Draw] road up East Draw - usual 6? 4:05, the 10 seen earlier today now
 200 yds. W. of bridge, km. 137 $\frac{1}{6}$, some on each side road. As car
 approached to bridge, all went to N. side onto slope of hill. ♂(?) lay
 prone facing car; ~~nearest~~ one of groups (watching me?). at km. 137 $\frac{1}{6}$, one
 100 yds. S. road, + across ^{streambed} ~~stream~~ 300 yds. S. road, 4 (2 juv.), at 4:15. The
 one near road retreated when I stopped, + when 150 yds. from the 4 was
 joined by another. The ♂ of the 4 defec., then ran toward the 2 + was
 met by the ♂. Latter gave chase, + with throaty rasping cries
 the chase went up + down the streambed (mostly out of my sight), the
 2 running parallel most of the time. The chasing for about 5 min. Then
 the 2 walked slowly up creekbed + the 1 toward its group. ♂ of 2 has
 3 concavities, 5 size, on lateral anterior side neck in lower half, as seen
 in some other ♂♂. The ♀ + 2 juv. walked 50 yds. to join ♂ - why 2
juv?

November 30, 1951 7:45 a.m., at km. 134 $\frac{3}{6}$, a group of
 51, prob. all ♂♂, scattered 350 yds. from base hills to N.
 road to 100 yds. S. road. as I drove thru on road, several
 crossed from S. to N. leaving 4 on S. side road (no fleeing from
 car passing 100' away). By 8:05, all 51 on N. side road. There on
 flat, about 50% ground cover, mostly short bunch grass mat +
 low cropped thorn bushes. 5/10 thin vines; fair E. wind. By 8:15
 saw 4 def. + ur. - ♂♂. They worked to W. between road + foot of
 hills to N. 8:45, group N. of km. 134 $\frac{1}{6}$, still scattered in

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ragged line & moving W. Several def. & ur. One moved from pile & gave wolf howl, 3X in succession, shaking head as it raised it, this a youngest one. 8:55, a playful slow fight between 2 yearlings (?) for 5 min. One persistently put head, mouth open, under belly of other & hit at hind legs. Occasionally hit at front legs. Sparring with heads & necks, one sometimes biting dorsal neck of other. Facing, one puts head under chest of other as if to trip or bite fore legs, & defending one bends one leg back, & sometimes both & goes down on wrists or prone. Occasionally both prone after such a start. One prone & other climbed astride, then lower rose so upper had forelegs straddling chest for 5 sec., top one hind legs behind others. No cries. No fast action. All rather lazy & playful. Once both reared up & entangled forelegs. 9:05, 2 play-fights going on. One involved 3, 2 head sparring & other biting & tripping hind legs of one contestant. Biting at wrists & metacarpal area. To get neck over other sometimes saw advantage of same sort, & occasionally rear up to accomplish this. One down prone and other then put neck & one foreleg over its back as if to keep it down. About 25 well undisturbed 60 yds. from car. One running pursued by another, pursuing one drawing alongside & putting head under belly other as if to bite & trip, chased one eventually down prone then rolling back toward aggressor. Down on up & puts neck over others & forces latter down prone. Of 25 close ones, only 2 possibly older juvs. (ears not white tipped). Lips against soil & mouth barely opening in grazing. 9:15, closest 25 working E., just N. of road, & other 26 250 yds. distant (to NW) working W. Another play fight. One forced other neck down with its own & then trip-

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red at wrists so other went down. Then then thrust head in front of hind legs other, running, & latter went down prone. Aggressor then could only bite at its heels but then it lay atop lower with forelegs straddling chest, but rose in 5 sec. To several seconds later the 2 prone side by side, wrestling necks. Then one running, other overtaking until lowered head near shoulder, then putting head under belly leader, but leader kicks out sideways with hind foot. Such kicks a regular part of fights. These 2 run on over to larger part of group. 9:30, group of 5 + 8 about 100 yds. apart near road at km. 13 1/4, & rest of group (save 2 or 3 individuals) 300 yds. to NW at foot of hills. Occasionally 1-3 rolled or lay prone, but no general resting. One ^{to 3} more fights going on almost continually. Putting neck over others & then biting or tripping front legs a favorite stunt. When one down, other puts one foreleg over chest & leans on, body to side or behind down one, then bites at head. Flat Flailing one kicks back & up with a hind foot at head of pursuer, hind quarters rising & the back reaching 1 foot or more above level of back. Continuous high squealing heard from some fighters. 9:45, the larger part of 51 joined smaller. Some foreign group (3-) got mixed up with the 51, it was a small pale juv. younger than any of the 51, & there was much chasing about for 10 minutes & many shrill grating throaty cries. The chasing spread the fighting impulse so that as many as 10 separate chase or duels went on at once. Sometimes 3 to 6 dashed fast for 1/4 mile together. Again several chased one. Big adults took part. The strangers went off toward the

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lake m. km. 134 (to S.) finally and the big band finally calmed down. at 10 a.m., the 51 about 200 yds. N. of road at km. 134 3/4 on flat ground. 2 prone; no fights. Some fights had blowing inter-ludes, one luluam at with head turned away. Muzzle held high when blowing or spitting, & ears back. When: shows another fast, the heeling back of leader opens gap 10±'. Once 4 prone; only 1 by 10:10. E. wind continues, shy 1/10 cumulus. 10:35, 2 crossed to S. side road & the group at site where at 7:45 a.m. 10:45, 14 on S. side of road. 11 a.m., several looked toward hills to N., & one nearest hills ran away to herd, & all to ^{N.} S. of road gathered closer - I suspected a fox but saw none, & alarm subsided in 2 minutes. 11:05, all but 15± on S. side road at km. 134 3/4. Then most flowed to ^{N.} S. side & grazed to W., but most back on S. side & grazing to E. by 11:20. Occasionally 1-3 rolled or lay prone a few minutes. 11:28, a car came down the road, occasionally honking, & all but 7 ran to N. side of road. One started across just in front of car but turned back to S. - somewhat sheplike in all trying to get together in danger. 11:30, only 2 still on S. side road. Then these over to N., all grazed to W. 11:40, 1, then 3 more, 50 yds. from others to S. side of road; others up to 150 yds. N. road in ragged line abreast. 12 M., group passed car, some within 60' (cross wind). Legs seem to work down into soil where no vegetation visible (at 20 yds. with binocs). One spit at head of adjacent one. One d. & u. on pile, then another came up & touched base of its tail with muzzle. First blew back at one behind & raised tail a bit. This whole action repeated 3X. One, prone, did not rise until advancing group 100 yds. beyond it. 12:05, all but 6 nearest to me headed NW toward foot of hills, running &

2

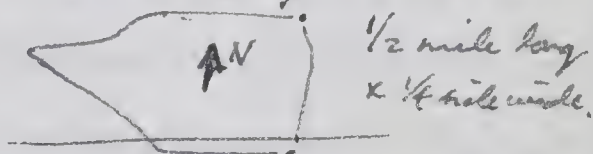
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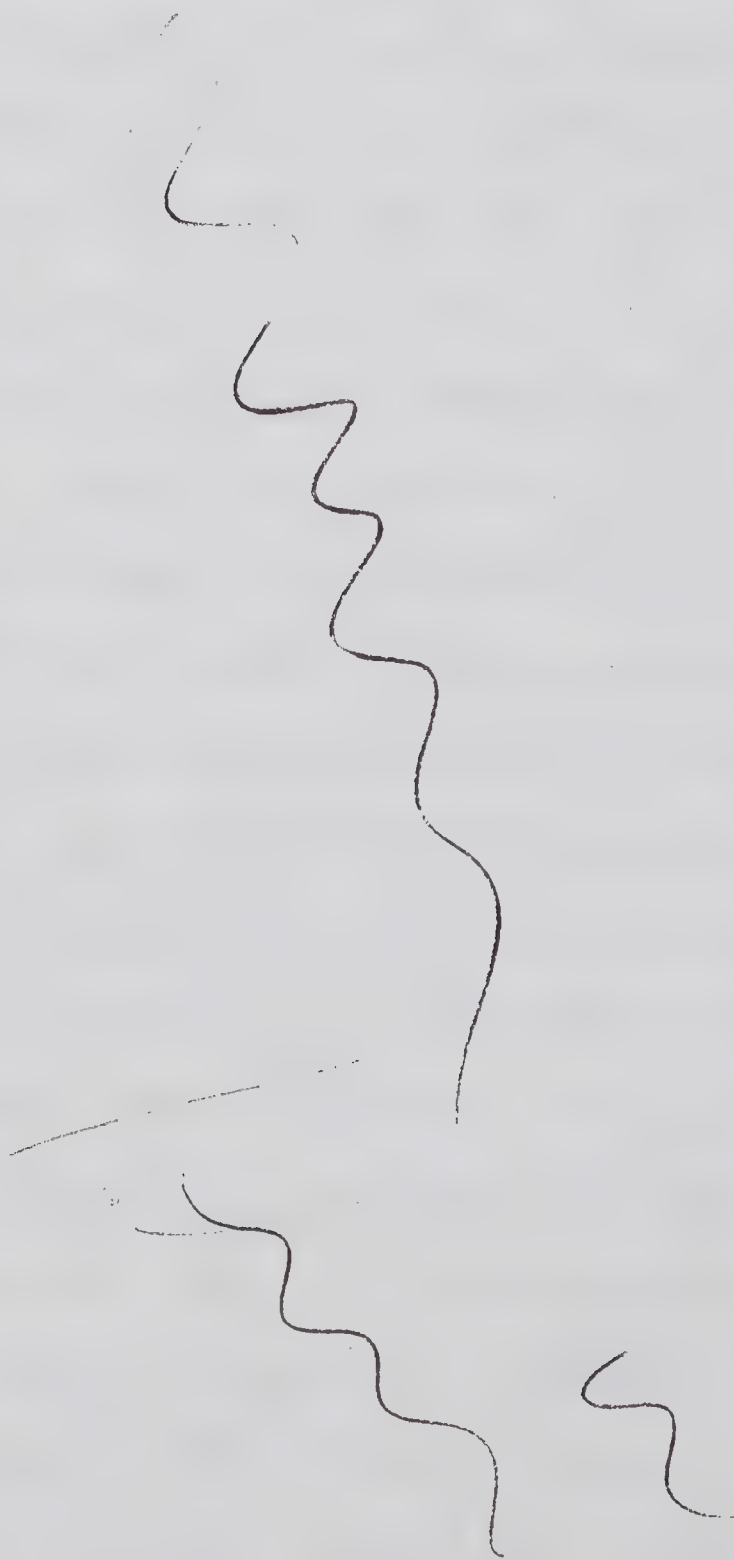
Huaylarco, 15000', Dpto. Puno, Peru

walking. By 12:15, the 6 + others of 51 about $\frac{1}{2}$ mile apart, several of larger group on lower slopes of hills, the 6 at road at km. 134 $\frac{1}{6}$. 12:20, 4 of big group started across + up hill, out of grass across bare dirt + rock onto high bare plain 200 yds. up from lower flat. Then other segments followed this route, about 18 by 12:25, + several were silhouetted on skyline as if feeding. The nearby 6 remained, seeming to pay no attention. 12:33, about 21 left at foot of hill; these walked 50 yds. E. + then up lower slopes. (This slope same as 15 ascended after 6 p.m. a few evenings ago). 12:37, 24 moving E. on skyline, barren dirt ridge, to ^{N.} of km. 134 $\frac{1}{6}$. The 6 together near km. 134 post. (6 + 21 + 24 = 51). The 24 + 21 move ^{E.} 50 yds. above base of slope, 300 yds. E. of 12:15 posit. Nearest of 21 + 24 about 200 yds. apart. 12:50, the 21 had angled up to rocky stratum of hill, $\frac{2}{3}$ to top, only 6± following the main trail ~~then~~ there. The 24 had disappeared to N. of skyline. 12:55, the 24 on skyline following course of the 21. The 6 still grazing near road at km. 134. Range of group, 8 a.m. - 1 p.m.;



I drove to lake + returning to road

chased the 6 - moderate run is 10 mph. There ran toward km. 134 mark, but the 15 now there. The ♂ ran toward them + the 6 went uphill on slope 100 yds. S. of km. 134. The 14 crossed to N. side road + ♂ stood at foot of hill, then (1:30) lay prone on flat sandy ground there. Group 100 yds. from ♂, 100 yds. E. of km. 134 post. (youngest juv. d. + w. may be ♂). The ♂ with usual 3 dollar-sized concavities on lower anterior-sternal side ^{neck.} 1:38, ♂ up + walked toward band. 1:50, I drove up to 100 yds. S. of group. No alarm, but they walked away to 250 yds. N. of car, ♂ paralleling bunch 100 yds. away. 5 young, smallest about $\frac{2}{3}$ size of largest. 4:30, km. 136 $\frac{1}{6}$, 6 below cor-



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rel 300 yds. to S. Km. 136 $\frac{2}{3}$, 6 including white-tipped eared
 juv. crossed road. Km. 137 $\frac{4}{6}$, at bridge, ^{4:35} 4:30 p.m., the 10 were
 250 yds. N. of road, 6 with tails up, & a fox walking very slowly
 only 10' from ♂. Three, not incl. juv. but incl. ♂, followed
 5 yds. from fox as it slowly walked over top of hill paying no
 atten. to vicuñas. By 4:38, the 3 not back to group. // Km. 138 $\frac{1}{6}$,
 where group of 11 yesterday, ¹⁵⁰ 100 yds. S. road, a group of 6 (3 juv.)
 & on flat bottom of W. Draw, where 3 yesterday, a group of 4
 (no juv.). Of the 6, the white-tipped eared ♂ juv. gone. Sky $\frac{1}{10}$ ci. &
 alto-stratus; fair W. wind. 4:50, the 5 200 yds. to W. up a mod.
 slope; grazed there. 4:58, the 6 to pool in streambed & some drank.
 The 4 then toward road. ♂ crossed & grazed 5:02, others 60 yds. to
 S. of it. One ♀ ad. def. & ur. on pile. 5:05, the band crossed to 100' W.
 of ♂. The band went to near ♂, then all went across & up
 slope 100 yds., ♂ leading, & over crest, 150 yds. N. of Km. 138 $\frac{2}{6}$, at
 5:10 p.m. At 5:30 I went to this crest & saw the 6 500 yds. N.
 of road (Km. 138 $\frac{1}{6}$). Perhaps disturbed for I had shot ducks
 with .22 by road. One of the 5 prone on slope of W. side
 of W. Draw 5:15-5:30, perhaps set for night. 5:35, near
 Km. 137, one prone 5-100 yds. S. road. 5:40, 5 far below cor-
 ral S. of Km. 136, & one ascended hill among grass clumps &
 lay prone. Overcast to W. when early darkness tonight. Wind
 dying. 5:50, 200 yds. S. of Km. 133 $\frac{3}{6}$, the group of 15,
 one 50 yds. from rest, ^{300 yds.} S. of Km. 133 group of about 4
 and 4, 100 yds. apart. Now ind. Well past sunset. At 6 p.m.,
 4 of 5 prone, 2 of 6 rearing up & fighting, the 15 grazing
 on open flat. 6:05, at least 3 of 15 prone on flat,

[Faint handwritten notes]

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 one pair rearing high together & fighting, & 1 chasing
 another & raising dust. Limit of visibility.

December 1, 1951. 4:20 a.m., light enough, saw the 15 on flat
 200 yds. S. of km. 133 $\frac{3}{4}$, about 200 yds. SE of where last saw
 them last night. I drove to 300 yds. of them & about 4 rose
 but lay prone again by 4:30. Some calls heard from those up &
 some defecated. Sleeping pose normal prone, neck up. About 600
 yds. W. of the 15, 12, all prone, and 400 yds. SW of the 12 were 6,
 all down (4:35). 0 of the 15, 3 juv. were each alongside & parallel
 to an adult, facing same way as ad. (other 2 disturbed?). 2 of
 the 12 grazed at 4:30. The 15 spread 50 yds. facing random di-
 rection, 200 yds. from nearest hill, on flat $\frac{1}{2}$ short bunch
 grass - no rocks or cover. 4:38, 1 of 15 up & grazed, & a third one
 of the 12. Prone ones of 15 chew cud. 4:40, 2 of 15 up. 4:41, 3
 of 15 up & grazing (all ad.). 4:42, seen on nearby hills. 4 ad. up.
 4:45, 5 ad. of 15 graze; seen on plain. 4:47, seen on the 12, & only 2
 still prone, but all of the 6, in shade, prone. 4:48, seen on 15 (6
 grazing incl. 1 juv.). 4:50, 4 more of 15 up. A juv. beside ad.
 rose, stretched - hind legs together and back, head low
 in front ; then to pile & d. & u. & a. & o. 4:52, 5
 of 15 still prone. A prone juv. yawned. 4:54, 1 of the 12 and 4 of
 the 6 still down, all in sun. 4:55, a juv. of 15 up, def. & ur., shakes
 left side of ♀ (still prone). 4 (2 juv.) still down. 4:57, ad. ♀ rubs
 side head on ground while prone, shakes head, rises & stretches
 with hind legs tending back, head down, neck in
 a crook ; then def. & ur. 4:59, One juv. moved
 side of a prone juv. & latter rose. One ^{standing} juv. straightened

Vicigno

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Huaylarco, 15000; Osto. Arequisa

rush + yawned. 1 juv. again prone (2 j., 1 A prone). Grazers up
 to 100 yds. N. of prone ones. 5:01, last ad. up., ur. + def. on
 pile. Then 1 juv. up, + as ^{thin} last juv. + ad. walk N. the last
 juv. rose (5:02) + followed others. All graze quietly to 5:30,
 spread 75 yds. 5:35, one (♂ ~~prob.~~) gives loud warbling whistle,
 9 warbles, first loud + fast with last 3 or 4 slower + dec-
 ending in pitch. The same juv. upon me (in car), he prob. saw
 movement (250 yds. away). ♂ then def. + ur. on pile, then graz-
 ed. The ^{cry} warning caused no movement and slight attention
 in the band. However, within 5 min. band gathered together +
 moved 50 yds. away, spread only 10 yds. The 12 are about
 300 yds. E. of this night resting spot, so 2 grouse about 400
 yds. apart on the open flat (5:45). By 5:48, the 12 had walked
 to 200 yds. W. of the 15. One juv. of 12 playfully put forefoot over
 back of another, then off, + a third put forefoot over back of first.
 One of the 12 grazes 100 yds. S. of others. The 6 have worked 5. ⁺ on
 their green flat among barren hills. 6 a.m., all the juv. + at least 2
 ad. d. or d. + ur. on one pile. An adult seemed to be bothered by 2 juv.
 close behind, + it lifted + bobbed its head, ears back, + when finished
 it walked alongside the juv. + spit at them. Youngest juv. play-
 fully ran + put forefoot on rump of another. One juv. moved
 tail of another which was defecating. 6:05, 2 of 15 prone, + another lay
 on side + rubbed head on ground. 4 down 6:07. 12 + 15 100 yds.
 apart. 0 of the 12, 4 juv. 3 juv. at feces pile, possibly eating ex-
 crement. One blew at another + then reared + put forelegs on
 its rump. Another jumped into side of ^{one} + latter retaliated
 by blowing at it. 6:18, the 2 grouse about 20 yds. apart,

Vicugna

December 1, 1951

Huaylarca 15000' Dpto. Arequipa

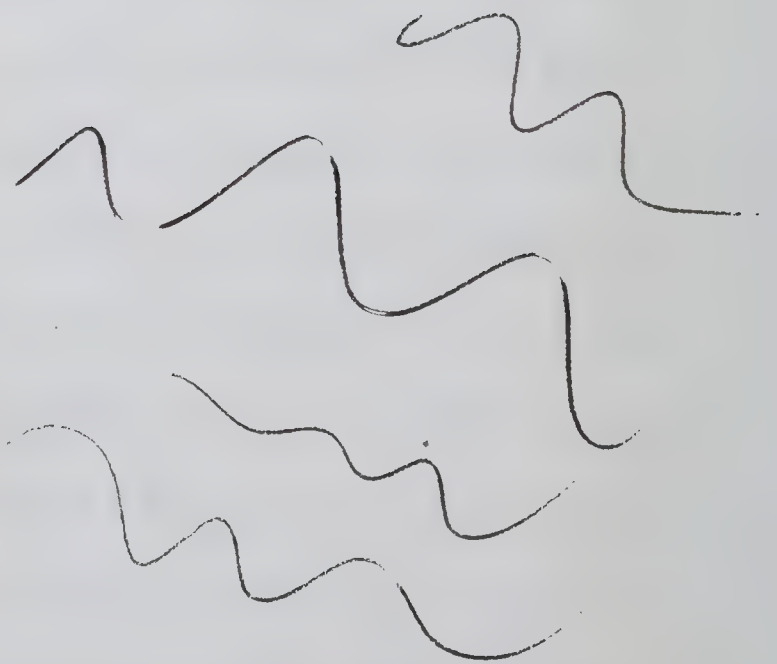
a shallow ditch between them. Only 2 down at 6:18. A juv. of 12 was prone but neck in S + tail up + huls up near back body level, facing ad. 6' away. Ad. dashed at juv.; one or both spit, + adult retreated quickly. By 6:23, all but 2 prone of 15 had with drawn 100 yds. from the 12. 6:35, the 2 prone ones, juvs., rose + walked a few yards, then had a play fight. Simultaneously each nipped wrists of other or put head under chest of other + bit at forelegs. Sparring + pushing about with heads + necks. Once they reared up + entangled necks + forelegs, then they ran back to groups, leader with tail up + neck in S. 6:46, 2 juv. of 12 wandered to the 15. ♀♀ chased them a few steps, one ad. ♀ having neck in S like juv., then ♂ shared 1 back to the 12 + the other followed. 6:50, 3 of 12 prone; 1 of 15 missed 1 + min. - not youngest juv. 6:54, only 2 of 12 down. The 15 about 100' S. of road. Several of both groups looked to N. where 3 others, 300 yds. N. of road, came over low ridge. ♂ of 15 crossed the road + went 100 yds. from its group toward the 3, + stood. 6:58, all 15 up; 1 defec. One of the 3 walked W. 100 yds. beyond ♂ of 15 + latter chased it for 100 yds., then stopped. One of the 12 stood ⁷⁰ 100 yds. from its group toward intruder. The intruder now 50 yds. N. of km. 133, + the 6 came toward it (moved 1/2 mile N. from earlier spot). One then others of the 6 chased the intruder a few yards but not vigorously + it wouldn't run away, perhaps a ♀. It stood with the groups for 5+ min., then when chased a few steps it walked off 20 yds. to W. Fair E. wind + now heat waves. 7:15, ♂ of 15 grazing just N. of road. A chase apparently by ♀ of 15 at nearly juv. of 12. 2 juv. of 12 about 30-50 yds. from 15, the main group 200 yds. SW of the 15. The 2 juvs. of 12 joined juvs. of 15 at edge of band. ♂ of 15 walked toward them (a ♀

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ad. near it with tail up) and finally ran at the juv., 3 fleeing but one peeling off after 50 yds. + joining joining a nearby ♀. A ♀ also ran to chase these juvs. a lit. A juv., male 5+ tail up, put nose near belly of 2 different ♀♀ but was repulsed, once with spit + kick (seeking drink?). 6:24, ♂, juv., + ♀ returning to the 15. Most of 15 on N. side of road, having gone toward ♂ there earlier. The 6+1 graze as a group 150 yds. N. of km. 13 3/8 east (6 territory). 7:28, the 15 at road at km. 13 3/2, the 12 250 yds. to SW, ^{both} ~~to~~ in 50 yd. groups. 7:35, the 1 grazes 50 yds. from the 6. 7:45, the 15 all N. of road, spread 100 yds. 3 of 12 prone at 7:55, 8 a.m., the 15 spread 150 yds. on flat. 4 of the 12 prone; 6 lay 8:03. 8:07, 1 of 15 prone. 8:10, 1 of 12 nursed, then ♀ walked away to pile + d. + w. Juv. followed + put head under ♀ abdomen but she walked off again + juv. d. + w. 8:12, only 3 of 12 down. 8 of the 15 are on lower slopes hills 300 yds. N. of km. 13 3/6. 8:17, the 12 all up + grazing 100 yds. S. of km. 13 3/6. 8:23, of the 6+1, 5 in a group + 2 50-100 yds. toward road; these last looked back the 5+ were joined by 2, + then + ran 100 yds. up slope of hill. The 12 nearly to S. side of road. A second of 15 prone. 8:25, the 12 started N. at a run, the 15 hunched + ran E. along base of hills. The 12 to top of low hill 300 yds. N. road, paused, then on over. The 15 went up a trail of steep barren hill, then straight up slope + out of sight. The 6 went N. over hill. A group of 10 (4 juv.) and 8 ran N. across flat from near lake. One group followed route of the 15. Other ran ^{to} near me and stopped. Then I saw 2 black dogs running N. following 500 yds. behind the 8. Dogs must have been 1/2 mile or more from some groups when they started fleeing. The 10



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ran back toward lake after dogs passed $\frac{1}{4}$ mile ^{E.} W. of them. Dogs continued on to mouth dry stream 300 yds. N. 133 $\frac{4}{6}$ (8:35 a.m.). This probably cause of other general fleeing I have seen. At 8:59, about 32 ♂♂ at km. 135. || 3:35 p.m., km. 137 $\frac{4}{6}$, at bridge, group of 11 (5 ad. 5 juv.) 200 yds. N. (the 10 of yesterday). 3:40, km. 138 $\frac{1}{6}$, the 6 (2 juv.) as yesterday, 200 yds. ^{S.} W. road, + the 5 ad. on flat of W. Draw as yesterday. Two drinks at 4' long pool in stream bed. 3 or 4 rolled on dusty spot on bank. || ♂ of 5 went 200 yds. W. after 2 ad. there, the 2 ad. retreating 100 yds. beyond ♂. ♂ then returned 50 yds. + grazed. || 5/10 cumulative, fair E. wind; hail earlier this afternoon. ♂ of 5 defec., then slowly walked up slope to 10 yds. from nearest of 2 (7 p.m.), + grazed. The rest of 5 remained in draw. They looked toward glacier which landed 100 yds. from them. || 4:05, the 6 crossed to N. side road about 50 yds. E. of km. 138. || The 11 seen at 3:35 went 200 yds. W., crossed road going S. nr. km. 137 $\frac{3}{6}$, then went on 200+ yds. S. across river bed. || 4:10, ♂ of 5 chased vigorously the ad. nearest it, + the other ran ahead for a few seconds before pulling off + remaining near former site, this chasing 300 yds. W. of flat at bottom of draw. 4:15, the ♂ of 5 ran back down slope to flat edge, 50 yds. from here. || The 6, 50 yds. N. road, grazed to E. 4:20. The ♀♀ of 5 joined the ♂. 4:25, 5 in file ran S. down draw 50 yds. E. of the 6. The 6 started + ♂ gave chase for 100 yds., stopping 50' on S. side road. The 5 appeared to be ♂♂. They walked S. 100 yds., across streambed, then ascended hill going S.W. The ♂ of 6 pursued no more tho the 5 walked thru his territory. 4:30, group of 11 (5 juv. - the 3:35 group?) walked up slope N. of

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 the 6, to 150 yds. N. of km. 130. ♂ of 6 did not attack them. The ♂ of 5 in W. Draw did not attack the 5 ♂ or ♂(?) tho they grazed in area from which it drove 2 earlier. Territorial tolerance may increase late in day. 4:40, ♂ of 5 started walking uphill toward the 5 200 yds. away, but the 5 retired over a ridge before ♂ within 100 yds. of them. ♂ grazed there, + by 4:45 its ♀ had walked up hill + joined it. The 11 (ad. prong + prong juv. beside) descended slope somewhat + the 6 grazed to W., 2 groups 100 yds. apart. 4:51, all 11 up; the groups 50 yds. apart + staring at each other. 4:55, the 11 + 6 grazed 20 yds. apart, peacefully, but often looking at other group. Then about 10 yds. apart but not a tail raised. 4:58, ♂ of 6 chased one of the 11, which ran in half circle + back to bunch, then joined main bunch before 11 ♂ reached it off. The groups then 100' apart. The 5 in W. Draw grazed NW along contour, 300 yds. above foot slope. 5:08, an ad. of 6 walked to 10 yds. from 11 (to def.?), then walked 5 yds. away + grazed. 5:15, 11 + 6 ^{50 yds.} apart, the 11 100 yds. N. of km. 130 post. || 5:20, km. 137 3/4, 9 (3 young) 300 yds. S., across streambed, on green flat at foot bare hill.

December 2, 1951. at km. 130 1/2, 2 bands on flat where no apparent vegetation. One band of 9 (2 juv.).

December 3, 1951. 9:30 a.m., km. 137 3/4, a group of 4 (1 juv.) 100 yds. S. road. I stopped. Closest ad., a ♀, gave stringy warbling descending call, 5-7 warbles, forced me (lips together + head unimpaired but abdomen pulled in call) and walked a few steps forward, juv. alongside, tail up. Then walked quickly 100' away, juv. alongside. Another called in higher key (♂?). all retired. ♀♀ call at alarm!

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²⁵⁰
200 yds. S. of km. 137 $\frac{3}{4}$, on S. side streambed, 10 (3 juv.),
5 prime, at 9:45 a.m. Lower $\frac{1}{2}$ ventral neck, legs, & underparts
wet & muddy, doubtless from bathing earlier. $\frac{1}{2}$ overcast; fair
E. wind. 9:55, 7 prime. Is this the 137 $\frac{4}{6}$ group?, usually N. of bridge?
9:58, all up & ran into streambed, then N. across road & 100 yds.
up slope, or loitering & looking to E., then chasing 1 (of 2)
across road going N. nr. 137 $\frac{4}{6}$. At km. 137 $\frac{5}{6}$ a man on
horse, coming W., doubtless the cause of the disturbance.
To S. of km. 138 $\frac{1}{6}$, picked up 4 skulls within 200 yds.
draw, 3 in streambed & 1 100 yds. from streambed. Carcass
remains including hide & wool, old & dry, near 3 skulls.
At 5:20 p.m., the usual 5 ad. in W. Draw. 5:30, km.
136 $\frac{4}{6}$, in a draw 200 meters N. of road, 45 (prob. 0707).

December 4, 1951. 9:45, km. 137 $\frac{4}{6}$, usual 10 100 yds. to N.
of bridge. Km. 137 $\frac{5}{6}$ / 138, 11 (the former 12?) 200 yds. S. of road.
Usual 5 in W. Draw. at km 138.4, ¹⁵⁰ 150 yds. to S. was group
of 6 (2 juv.), and 100 yds. E. of them a scattered group of
22, probably 0707 (10 a.m.). 3/10 cumulus; fair E. breeze. Many
of the 22 wet as if had bathed. The 6 on bunch-grassy green
flat. 10:05, one of 22 def.; definite 07. One of 6 lay on side, then prone
(10:05) - up 10:10. Two other ad. of 22 prone 0707. The area where 22
has been defended by another 6 in the past, but not in sight
today. 10:15, an ad. of 07 gives wolf howl at pile. This is one
of a group of 5 (1 small young) 30 \pm yds. from nearest other,
& now seems to be the old 6 group of E. Draw. 07 of these 5
chased 3 or 4 of the others nearby. One of the larger groups
10 0707 (+ the 5) faced me & gave loud grating call. The 6 looki-

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ed toward seller & seemed undisturbed but others walked to E. along + up slope, 11 (no juv.) still on E. Draw side of hill by 10:25, a lone one 200 yds. up draw S. of them. The 6 grazed to W. The last of the ♂ group going E. on hill (10:30). 10:32, juv. of 6 d. + w.; a ♀. 10:43, an ad. ♀ of 6 lay prone, group now in angle between main stream & W. Draw stream. 10:47, the 1 stood & joined others. 10:57, juv. rolled.

11:07, 12 about 100 yds. up slope from 5. ♂ of 5 ran after closest & latter fled down slope past ♀♀ of 5. 2 ♀♀ followed chase some, tails up. ♂ chased intruder across ^{E.} Draw, to 200 yds. from ♀♀. The chased one appeared to be a yearling. It ran toward the 6, stopped 100' from them, then ran E. toward mouth of E. Draw. Then it was met by an adult which ran parallel for 50 yds., then stopped as chased one went on upstream. This ad. then was joined by 5 to form group of 6 (1 juv., small) 100 yds. S. of them. (38.5). The 6 then grazed on green wet slope near streambed. 11:15, the other 6 (2 juv.) walked 80 yds. up W. Draw & at least 3 rolled in soil near streambed, then all up & grazing near W. Draw streambed. The 5 together on flat, paying no attention to 16 150 yds. up slope S. of them (some wet; some as the 12 ♂♂ seen earlier but now 1000 yds. distant?). 11:20, one ad. of W. 6 prone. Two of this group now muddy from being (?) wet & rolling in dust. 11:26, second of W. 6 prone. 11:30, the ♂ band - now about 35 in sight - as close as 100 yds. beyond the W. 5, & 2 pairs fighting, high wailing cries heard constantly at distance of 1/2 mile. 11:33, ♂ of 5 ran 300 yds. NE to a group of 7 and chased stopped near them as they retreated 100 yds. ♂ of the W. 6 ran 30 yds. toward but stopped

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short also, then grazing, slowly returned toward group (1 prone).
 The 7, just W. junction main + W. Draw streambeds, have 1 juv.,
 + are 150 yds. from the W. 6. In all, groups: 35 \pm ♂♂, the E. 6,
 W. 6, the new 7, + the W. Draw 5. 11:40, of the E. 6, 1 juv.,
 1 yrling., others ad., apparent ♂ redder + brighter than others;
 juv. at 11:45.
 2 prone at present. || 150 yds. W. of W. Draw + main stream junction,
 a group of 9 (one - the 11?). || 11:50, the 7 100 yds. from the W. 6;
 then ♂ of W. 6 ran at them + stopped, + the 2 walked away. The
 7 came near the 9 (now 11), + 2 juv. of " walked to the 7. No
 chasing but stiff postures + tails up. By 12 M, three groups
 100 yds. apart but now 9 in each (2 juv. stand 50' from
 old 7; one of 7, ad., approaches cautiously a tail up juv. +
 then retreats suddenly to group - spit at?). Meanwhile, ab-
 out 10 chased down E. side of W. Draw toward the 35, + ♂
 of the 5 then joined in the chasing about of some of the big
 band ♂♂. Some fights between adult ♂♂ + usual
 high cries heard. The big bunch of 45 near bottom of
 draw, + the 5 200 yds. down draw from them, the W. 6
 50 yds. below the 5, at 12 M. The ♂ of 6 had chased 1 of
 big bunch which came near but had not pursued into
 main group. 12:05, ♂ of 5 runs to the 45 + they retreat
 up slopes to W. of bottom of draw. Another chasing ♂ there.
 One of the 2 ♂♂ chase 30 \pm in tight bunch uphill ahead of
 it. ♂ of the W. 6 ran 100 yds. down draw + chased the 2
 separated juvs., + later the 7 which drew near the W. 6.

Many fights among the 45, at least 5 at once, mostly
 stimulated among themselves by excitement. ♂ of the 5

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much more active than ♂ of W. 6 in fighting the 45. Mainly herding - runs at one group until they start running, then runs at adjacent group. 12:20, ♂ of 5 (distinguishable by mud on it) still chasing the 45, but they are 100 yds. upstream from the ♀♀ of 5 nevertheless. The 6 are 50 yds. downstream from these ♀♀, + the 7 150 yds. further down, + 9 100 yds. NE of the 7 (2 juvs. ?). The 6 in E. draw now (12:25) 200 yds. from road, apparently unaware of action in W. Draw. The group of ♂♂ now 51. ♂ of 5 back with its group and standing 20' from the W. 6 as if at boundary territory, none of 6 showing any resistance. ♂ of 6 smaller + older than ♂ of 5. 12:27, ♂ of 5 dashed into the 6 + they fled 50 yds. except for ♂ who, tail up, ^(squeaky cry heard) ran after the ♂ of 5 as it returned to its group, + the 2 ♂♂ then stood 5 yds. apart. 12:32, ♂ of 5 off again. It ran at 2 young ones 150 yds. up canyon, then crossed to W. side of draw + skirted the scatters 50' + drove lower over higher on the slope, finally stopping 300 yds. from its harem. 12:40, 2 (young ♂♂?) came down draw 50 yds. from the W. 6 + were chased by ♂, over to near the 9 about 200 yds. away, other peeling off on the way. Both juvs. of W. 6 d. + u. on same pile simultaneously; both ♀♀! 12:43, the 6 + 5 about 150 yds. apart near streambed in W. Draw, the big bunch of ♂♂ over a ridge 300 ¹⁰⁰ yds. S. of the 5, the 7 100 yds. W. of the 6 and the 9 (now 11 again!) 50 yds. beyond the 7. One graying on edge faces pile holds tail T as if small stimulates tail raising + defecation. An ad. ♀ of 7 def. + ur., so not a ♂ group. 10.m., all overcast + moderate hail commenced, wind

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from E. 1:05, the E. 6 as before, grazing. ♂ of 5 attacked the 7, tho
 there 100 yds. closer to the W. 6, but on 5 territory. One, prob. ♂,
 of 7 kept between ^[5?] 6 ♂ + band, + band gathered in knot. Some
 high carbon-glass criss. The 7 moved 50 yds. away, to ^{NW} NE, + ♂
 of 6 went 100 yds. back toward its band, 300 yds. away from 7, by
 1:08. The 11 retired NW about (pm. 1:10, ♂ of 6 looked down to
 main streambed after 2 adults, ^(+ other?) there S. of km. 130.1, about 200
 yds. from the band of 6. ♂ of 5 back at its band 1:16. 1:17, ♂
 of 6 walking back toward its group. The 7 crossed a low
 ridge going NW, to somewhere S. of km. 130. 1:30, E. 6 about as at 1 p.m.
 The ♂ of 5 grazes 50 yds. W. of the W. 6, 150 yds. from main
 group (1:40). Hail is on + off, never hard. 1:50, ♂ of 5 back
 with its group. ♂ of 6 about 50 yds. from ♀♀. Starts to hail border.
 ♀♀ together walk quickly 100 yds. up draw to bare hill, often
 giving head a quick sideways shake or twitching ears (on sect.
 hail), + all lying prone, backs to wind, within 15 seconds. The
 prone ones " " 1, each pair being ad. + juv. ♂ walked toward
 the ♀♀, stopped at feces pile + gave small bawl, then d. + u.,
 then grazed 10 yds. from prone ♀♀. The 5, 50 yds. away,
 remain up + grazing. 5 of the 6 in E. Draw also prone,
 backs to wind, + one ad. up grazing; no 2 ^{close} ad. together.
 1:58, the 7 reappeared 150 yds. downstream from the 6; there
 standing rather stiffly, backs to wind. One of 5 prone. 2 p.m.,
 hail stopped but fair wind continued. 2:07, ♂ of 5 stands halfway
 between ♀♀ and a group of 10 about 150 yds. up the canyon.
 2:10, one of prone ♀ of W. 6 stands; adjacent juv. puts its head under
 her abdomen for a moment. Then separate ♀ up, then all. ♂ of 5

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chases away 5 of them farther up the draw, the other 5 retreating without being chased. All lost juv. of E. 6 up by 2:10. The 7 walked 100 yds. down canyon & grazed 50 yds. S. of km. 138.1. The ♂ of 5 returned halfway to group, def. + ur. on rock, 2:18; then grazed near group. 2:25, ♂ of W. 6 stood 5 yds. from ^[= 7.] but made no chase. 2:35, ♂ of 5 continued to stand close to the W. 6. 2:40, the 7 crossed to N. side road near km. 138 ^{7/8}, in territory of the W. 6. ♂ of W. 6 stayed 5-10 yds. from W. 6 until 2:53 p.m. when it chased them 100 yds. down W. Draw. One ad. ♀ of the 5 spit at another & crowded against it, the two going around in a circle on one spot, & then hit down hard ^{with head or neck} on neck as if biting. The E. 6 were near mouth of draw, 150 yds. S. road. Steady W. wind & all overcast. ♂ of 5 remained 100 yds. from ♀ ♀; at 3 p.m. they walked to near ♂ 11. I moved to km. 138 where the 11 (5 juv., none tiny) grazed 200 yds. to S. ♂ of the 5 came running to 100 yds. from them, & they all fled 50-100 yds, then descended 50 yds. to streambed after the 5 ♂ returned to E. 6. 3:12, the 4 ♀ ♀ of 5 joined ♂ on the table ^{(other here in afternoon) [= 5 138 Flat]} 200 yds. S. of km. 138 (100 yds. E. of where 11 had been). 2 ♀ ♀ of the 5 had mild fight. One put head over back other neck; other curved its neck around first's. Pushing on necks. One reared & grasped other rear but slipped down so grasping hind leg between forefeet. Both reared facing but 5' apart, at a time; then both reared & came together entangling forelegs. No sounds. 3:15, 2 of 5 prone there. The 11 went on downstream. At km. 137 ^{3/4}, 3:20 p.m., the 10 (4 juv.) 150 yds. S. of road. The ♂ ran upstream, evidently after the 11 which were descending. 3:26, ♂ walked back to 10 group ^{some} (one foot steps every

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second in slow walk).

December 5, 1951. 12:30, the 11 100 yds. N. of km. 138 mark. 1:20, the 6 (2 juv.) 50 yds. N. of km. 138.2. The 5 at E. side mouth of West Draw, grazing (where the 6 at 2 p.m. yesterday). The 11 apparently graze both N. & S. of creek here, & adjoin group of 10 at km. 137 4/6. 3 p.m., at least 7 (the 10?) 200 yds. N. road at km. 137 4/6 (137.7) & 11 200 yds. N. of 137.8. 3:07, I parked at km. 138.2. 8/10 (2 juv.) ^{ad.} canchus, fair W. wind. The 6 at E. side mouth W. Draw and the 5 (0 juv.) in close bunch 100 yds. up draw (out of 6 halfway between gps.) ^{ad.} of 6 with gp. (3:13). 3:20, 5 & 6 only 10 yds. apart; some stare at other groups occasionally. The groups are close as 10'; then further apart, 6 moving away, out of 6 closest to 5. 3:30, the groups 100' apart. 3:35, the 5, out leading, walked NW across streambed & onto usual slope. out ran 50 yds. ahead to pile & d. & u. The 6 walked parallel but at foot of hill, 50 yds. below 5, & some d. & u. The 6 continued to 50 yds. S. of km. 138 1/10, then gp grazed & out walked to near road. The gp crossed toward out, juv. last, some stepping in a few inches water. 3:45, out crossed to N. side road at km. 138.05. 2 min. later all others crossed in file. All 6 graze 75 yds. N. km. 138.1. (the 5 graze 200 yds. S. same spot of road). 4:15, the 6 100 yds. N. km. 138, & the 11 100 yds. N. km. 137.9.

December 6, 1951. 7:30 a.m., 2 in streambed 200 yds. above camp. at km. 136.6, 2 AIT 100 yds. SE of road. km. 137.7, 11 150 yds. NW of road, 8 of the 11 lying on side or prone (7:35). My former designations N. & S. of road are more accurately NW & SE, actually meaning at right angles to road. 5 of

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the 11 up at 7:40. The draw 50 yds. SW of the 11 is about division between grass 10+11 here. Ahead, on ^{SE side} rocky hill NW of km. 138.3, I see 6, highest on rocky brow of hill. 7:45, 5 of 11 still down. 7:48, 7 down again. Sun is shining; no wind. 7:51, only 5 down. :52, 3 still down. :54, 2 only down. :56, 1 - last up. 5 juv. in the 11. All walk toward road. 2 juv. def. before walking on. Adult leads by 50 yds. Leader across road 8 a.m., at km. 137.7. The leader stood on road bank, not grazing, + others remained across road. A car passed between - the ad. + the group fled 20 yds. away on respective road sides. 8:12, a group of 4A1Y crossed SE to NW side road at km. 137 ⁶/₁₀, 50 yds. from car, the leader (♂) nervous, shying occasionally. One ad. ♀ seemed to have hairless abdomen - mangy? These 5 ascended hill to NW of road, & at top one gave ⁵ successive cries about 1 sec. apart, lasting ²/₅ seconds, in near whistling high tone. The 10 (of 11) walked to near km. 137.8, then went 200 yds. NW of road (8:18), and a group of 5 (no juv.) paralleled them 100 yds. to N. 8:22, another prob. ♂ of 11, 50 yds. beyond the 10 toward 5, but no chasing. 8:25, 3 of 11 - def. on pile. One juv. gives wolf howl, 3X (prob. ♂). The 6 at km. 138.3 closer to road but one of it. 8:32, ♂ of 11 walks, then runs, to behind the 5, & chases them uphill, its tail up, & runs hard at 1 or 2, driving all about 100 yds. away from its own group. 8:37, one (the returning ♂?) runs to the 10, tail up, & chases 1, then follows ♀ and juv. which flee, tails up high. These 2 return to herd & ♂ does not pursue. Juv. touched upraised tail ♀ ad. a few X & ♀ lowered tail at this - Tail sensitive? ♂ then placidly grazed 50' from nearest of 10 so prob. 11 ♂ who chased, half-heartedly, own group. 8:45, at least 10 of 6 at km.

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138.3 is on SE side road. 6 also visible at mouth E. Draw. The 11, together, 100 yds. NW of km. 137.9. The ^{juvs.} often together, rarely paired with ad. ♀♀. 9 a.m., all of 6 on SE side road at km. 138.3. A juv. of 11 walking 6' from an ad. held tail against top of rump, neck in S, + fore legs bent. In same pose it put head to head of adult, then backed away + put muzzle under abdomen another, this one raising hind leg on that side twice + juv. then withdrawing. 9:10, juv. rolled on loose dirt spot, then remained prone to 9:18, then up as ad. walked past. Ad. then rolled + remained prone 1 min. 9:35, ♂ of 11 crossed to SE side road at km. 137.95. 9:39, in draw 200 yds. NW of top rocky hill NW of km. 138.3, a group of 6 grazing (same 6 as SE of road earlier?). 9:37, a second of 11 across road, at km. 138.; ⁵ across by 9:39. 6 across by 9:46. 9:47, a car passes; 5 on SE side road. 9:53, all run to NW + hunched, suddenly; then slowly walked farther from road. A few drops of rain and all overcast. A ♂ juv. gave wolf howl, then def. + ur. on one pile. Another juv. shook head sev'l X while moving pile, then def. (only) + walked on. 10 a.m., the group 100 yds. NW of km. 138. 10:05, a juv. prone, + an adult beside it at 10:07; both up 10:08. Lightly raining. 10:15, ♂ of 6 to SE of km. 138.3 runs toward the 11, over 300 yds. distant, + all 11 flee to SW parallel to road for 100 yds., then stop as pursuer stops. ♂ of 11 then runs after pursuer for 100 yds. on reverse track, tail up, + 2 stops 20' apart. ♂ of 11 goes to feces pile + nose it + works feet (rears; perhaps does not defecate). 6 ♂ chases it a few yards, then runs to pile 100' distant + def. + ur. 11 ♂ looks at group by 10:18, + 6 ♂ halfway back but NW of road still. 10:21, the 11 went over top of hill 200 yds. NW of km. 137.9. 10:29, 6 ♂ crossed road back

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Haylarco, 15000; Osta Areguipa


to its group, which had gone toward it 100 yds. since ♂ left. I drove up road; 2 vicuñas at km. 139, & only 6 vicuñas seen to km. 142. Km. 142½, 45± in groups ½ mile NW of road, and 12 in another group. All overcast, no wind. 11:30, back at km. 138.3, the 6 100 yds. SE of road on far bank streambed, the usual 5 not in W. Draw. Occasionally 1 of 6 rolled on sandy soil. 12M, all 100 yds. further S. 12:15, sprinkle commenced; 3 soon lay prone.

December 7, 1951. 7 a.m., km. 138.2, 22 (no juv.; prob. all ♂♂) at NW edge road. I stopped 250 yds. from them. They soon began to cross to SE side road. 7:00, km. 138.4, 6 (2 juv.) 100 yds. NW. 7:10, km. 138.7, ad. ♀ + ♂ 75 yds. SE (the 3 missing juv.?). The 2, alarmed by car, walked to 50 yds. NW of km. 139. Just SE of km. 139 a group of 10 (4 juv.) on flat between road & streambed. 3 juv. ran past an ad., 2 raising tail in so doing. One juv. put fore legs on rump another for a second. By 7:25, the 10 grazing at km. 139.05, 2 on NW & 8 on SE side road; I am parked at km. 138.9. Overcast; no wind. 7:34, 5 on SE side road. A juv. 6' from ad. ♂ assumed the half-squint position with neck S and tail up on rump. 7:35, ♂ of (+ all of group to SE side road) stopped — 10 ran 100 yds. SE of band, ~~stopped~~ a chase going on 300 yds. SE of km. 139. The ♂ ran off in that direction — then about 50 vicuñas there ^{with} several chases & fights going on. One ad. reared up & got one fully across back neck other, & the 2 remained thus 15 seconds, lower turning around in circles. Evidently a ♂ band had encountered ♂-♀ band here. 7:47, ♂ of 10 back with band, then ran 50 yds. to edge road at km. 139 where ♀ (of 2) on opposite side road. ♂ (of 2) ran from 50 yds. NW of ♀ at the 100, & ran parallel to it

Vicugna

December 7, 1951.

Huaylarico 15000', Depto. Arequipa

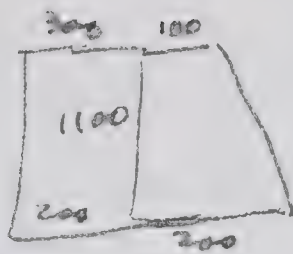
as 10 ♂ ran back to band. 2 ♂ then d. & u. on pile 100' from the 10. A stray ♀(?) was 50 yds. S of the 10, & ♀ of 2 ran to it, spit at it, then moved tail. 8 a.m., the 2 (now 3) up close to SE of stream bed, ♂ apparently chasing an ad. which then ran down canyon. The third one of the 2 walked off to SE without being chased (a ♀?). 8:10, ♂ of 10 went loping off to N. for 300 yds. to head of draw (E. of km. 139.3) to where 20± grazed steep hill. ♂ stood, tail up, 5 yds. from them & they did not move. Then it moved closer & group moved away. By 8:30, ♂ of 10 not back. The 2 grazed 100 yds. S. of the 10 (- ♂). One of 10 drank at semi-circular pool, 2 drinks. 15± sec. long, nostrils well clear of water , cheeks moving but not head or throat. Feeding mostly at dark green mat growing on banks near water. ♀♀ pay no attention to sounds fighting in distance. 200 yds. upstream from road at km. 139.25, a group of 9 (0 juv.) - all ♂ ♂? 8:45, apparent ♂ of 10 grazing 100 yds. NE of the ♀♀. 9:07, ♂ only 50 yds. from group; a juv. lying on side. 9:10, an ad. prone. 9:13, another juv. prone. 9:22, ^{a juv.} ad. up. 9:25, the 9:15 juv. up. An ad. defec.; adjacent juv. noses its anal region. A juv. d. & u. same pile. One scratches top head, head low & turned to one side as hind foot scratches. One nibbles at metatarsus, hind leg raised. One scratches near axilla with raised hind foot. 9:33, the ad. up. ♂ walked to 50' from band, still at creek bed SE of km. 139.1. 9:40, a juv. to pile & d. & u. (♂?); another approached & touched tail with nose, then second (♀) d. & u. Both eyes work furiously on pile before defecating, then move so that feces fall near trodden point. 10:42, an ad. def. (only) on

Vicugna

December 7, 1951

Huaylarco, 15000', Depto. Arequipa

same pile. One ad prone 9:41; up in 2 min. Ad. ♀ d. + u. same path, ~~up~~ in more to urinate. 9:50, one sawed itself in pool & emerged dripping. 9:55, a juv. sawed in same pool. Overcast; fair E. wind. Another juv. sawed. 10:10, the 10 in close brush in creek bed opposite km. 139. An ad. (♀?) walks up slope 100 yds. down stream from the 10; ^{another (♂?) 50 yds. below ♀.} no reaction (boundary betw. 2A and 5A5Y?). Ad. ad. prone in loose soil; rises muddy on legs. The 10 go SE up draw 50 yds. (10:15). Juv., wet, rolls, so muddy. 10:18, ♂ def. on pile. A juv. gave start as Duvica flushed near it. 10:20, the 10 are 150 yds. up shallow draw. A group of 8, ^{1 juv.,} all ^{ad.}, 75 yds. farther up. Take 2 groups mixed, 10:27, without animosity. 10:32, ♂ of the groups go into a chase, the groups separate & ♂ of 10 follows ♂ of 8 back to its group. The 10 move 50 yds. NW of the 8. Muddy juv. goes to muddy ad. ♀ & nurses for 1 min. ⁵⁰/₃₅ sec., taking head out at 80 and 115 sec. for 3⁺ sec.; then ♀ takes a few steps & nursing stops. Juv. was at rt. angles at rt. side. ♀ stood, head up, saw horizontally back, during nursing. 2 juv. of 10 had mild fight which increased in severity until growling cries heard & 1 chased other for about 1 minute, circling, pursuer nipping at neck, shoulder, wrists, & ankles. Then the 2 grazed peacefully 6' apart. 10 ♂ stayed near the 8 until 10:48, then walked across slope to 50 yds. above its group. ^{the} up 10:57. 10:50, muddy ad. ♀ prone. Its young does not stay nearer to it than others. A juv. rolled on dusty spot, rose, shook. 11:11, muddy ad. prone again. ^{up 11:13.} Group scattered 80 yds. up rocky slope. 2 adults roll simultaneously. 11:18, 2 ad. prone. One rolls 1 side, other, front; then prone, & 1/2 min.



$$\begin{array}{r}
 400 \times 1100 \\
 400 \\
 \hline
 440000.0 \text{ kg. m.} \\
 484000 \\
 9 \overline{) 43560} \\
 \underline{36} \\
 75 \\
 \underline{72} \\
 360 \\
 4353
 \end{array}$$

$$\begin{array}{r}
 5280 \\
 1760 \\
 44000 \\
 99 \\
 \hline
 4356 \overline{) 39600.0} \\
 4
 \end{array}$$

$$\begin{array}{r}
 1200 \\
 440
 \end{array}$$

$$\frac{3}{4} \times \frac{1}{4} = \frac{3}{16} \times \frac{40}{640} = 1204$$

$$\begin{array}{r}
 3 \\
 12 \\
 5 \\
 10 \\
 15 \\
 8 \\
 \hline
 54 \text{ min}
 \end{array}$$

Vicugna

December 7, 1951

Huaylarco, 15000', Dpto. Arequipa

later rises & shakes. Other prong one up 11:22. 11:30, the group stops hill about 250 yds. opposite km. 139.15. Since started watching, group (excl. ♂) within $30 \times 150 \times 250$ yd. space, ♂ in space $300+ \times 250+$. 11:40, the 10 near head of draw E. of bridge, & a chase going on with another bunch. The 10 apparently hold territory in this draw & the one opposite km. 139 & space between. 11:45, km. 138.7, ad. ♀ prong 75 yds. SE, & ad. ♂ 100 yds. downstream (^{2 where} ~~as earlier~~ earlier today). Km. 138.3, 5 (2 juv.) at NE side W. Draw at mouth, & 3 ad. (of 5?) 100 yds. to SE. 11:50, km. 137.5, 9 (4 juv. & the 10-♂?) ran across to N side road & 100 yds. on, up slope. 100 yds. SE of road the ♂ chasing group of 15 (2 juv.). The 15 chased to NW side road & up slope, 150 yds. S. of the 9, by ♂ (of 9 prob.) & another apparent ♂. 12 M, km. 137, 4 (2 juv.) in river bed to SE. 136.5, 11 (1 juv.), 2 or 3 wet, on slope to NW.

December 8, 1951. 6:30 a.m., 18 (0 juv.; prob. all ♂ or ♂), 100 yds. from camp on stream floodplain. 6:50 a.m., group of 8 (2 juv.) 200 yds. NW of road at km. 134 ¹⁵/₁₆, 3 prong, on flood plain. ¹⁵ about 200 yds. NW of km. 133 ⁴/₁₆ on flat. 12 300 yds. SE of km. 133, and 3 about 200 yds. SW of km. Barren loose soil areas wet color from ^{wet} snow yesterday. By 7:25, the 15 had moved to SW about 200 yds. on flat. Another 6 grazed near km. 133 marker. Clear; SE wind. 7:25, 3 of 12 prong. 7:40, 6 about 100 yds. SE of km. 133, 10 about 100 yds. NW of same. The 15 on flat 200 yds. NW km. 133 ¹/₂. The 12 scattered 100 yds., 500 yds. SE of km. 133, & 3 100 yds. SW of the 12 (the 8 not observable).

$$1000 M = 1056 \text{ yds.}$$

$$1 M = 3281'$$

$$1000 M = 3281' = 1094 \text{ yds.}$$

$$\begin{array}{r} 1094 \\ 1094 \\ \hline 4376 \\ 4846 \\ 10940 \\ \hline 1196836 \text{ sq. yds.} \end{array}$$

$$\begin{array}{r} 2474 \text{ A. m. sq. ft.} \\ 4840 \overline{)1196836} \\ \underline{9680} \\ 22883 \\ \underline{19360} \\ 35236 \\ \underline{33880} \\ 1356 \end{array}$$

Vicugna

December 8, 1951

Huaylarca 15000', Depto. Arequipa

7:48, 3 of 10, 0 of 12, none. ^{silence} allowing rectangle $\frac{3}{4} \times \frac{1}{4}$ mile which included all these vicuñas, 5 ~~4~~ in 120 acres. 7:55, 6 of the 10 down; 8 a.m., 7 down. 8:05, the 5 at foot of low hill where many bunches coarse grass. 8:14, the 7 ~~down~~ down of 10 got up. The 15, led by one 50 yds. ahead, had walked along foot of slope toward 10, but still 200 yds. from them. 8:20, a man $\frac{1}{2}$ mile SE of the 3 + 12, walking toward them. The 6 about 300 yds. SE of him. 133. The 6, 12, & 3 all on same pole [S. 133 Flat] green flat. The 15 + 10 100 yds. apart. 8:30, one of 10 stood 10 yds. from the 15; no chase, but ~~most of~~ 15 slowly walked away from the one. ~~The 6 now 7.~~ Ad. (♂?) of 15 lay prone west est to 100 of group. One of the 12 100 yds. from group, near the 6. 8:37, the man walked NW about 400 yds. SW of the 3. The 3 came together, & the 3, 12, & 6 stood, but none fled. More fear of dogs than of man! 8:49, 2 of 6, 1 of 3, 2 of 15, none. The 15 + 10 100' apart, one of 10 standing halfway toward 15. 9 a.m., the 6, 12, & 3 in triangle $\begin{array}{c} 6 \\ \diagup \quad \diagdown \\ 3 \quad \quad 12 \end{array}$ about 100 yds. on a side, 6 nearest road, 2 each of 6 + 12 lying down. The 10 + 15 have moved to roadside, the 10 at km. 133 and the 15 50 yds. to NE, 4 of 15 lying down. Sunny & nearly clear. The 10 + 15 gradually crossed road; 6 of 15 which were lying down got up 1 by 1 and crossed after others; the 2 groups still 30 yds. apart (9:25). The 6 about 200 yds. from 12, on lower slope of sandy hill. One of 12 near the 3. An Indian $\frac{3}{8}$ mile SE of the 12 + approaching. One of the 10 chased back 3 of the 15 which drew near. 9:37, the 3 and 12 started to run toward the 6 and road. The 6 looked but did not

Vicugna

December 8, 1951.

Huaylarca 15000', Depto. Arequipa

start to run until others there. Then all ran toward him. 133 marker. The 10+15 started, & 1 raised tail & advanced toward runners. Then when runners 50 yds. from them, the 10+15 ran too. Together but more a less in original groups, all ran on 200 yds. NW of road to foot steep barren slope & first stop not made until all 50 yds. up slope, 600 yds. from starting pt. Then all ascended rocks to hilltop & went on out of sight, $\frac{1}{2}$ mile from start, & $\frac{1}{2}$ minutes after starting run. At this time, Indian still 200 yds. short of where closest groups had been. The Indian, a boy, ran some, & followed path of the vicuñas to hilltop & on, & Indian man, carrying what might be a gun, was walking fast along sandy ridge $\frac{1}{4}$ mile NW of boy. Apparently hunting vicuñas, first man taking stand near a narrow part of spit-like ridge top & boy driving them over. At about 2 p.m. I found a dead ♀ vicuña, shot through chest & bleeding from nose, on flat near km. 132. Either shot & let lie or wounded, escaped & died. After dark visited the spot & found body had been dragged away. Tracks showed 2 men in shoes had dragged carcass to dual wheeled truck at roadside.


December 10, 1951. At 6:10 p.m. last evening a group of 12, no young (prob. all or ♂) grazing on slope of sticky bunch grass 200 yds. SE of camp. Then grazing there at 4:50 a.m. 6:50 a.m., km. 134 $\frac{4}{6}$, group of 14 (4 juv.) 200 yds. to SE, & 9 (2 juv.) at road (possibly ♂ of 14 ran to the ♀ so count should be 15 & ♂). The 12 went NE to streambed near km. 136. At 7 a.m., 9 on gentle barren-appearing slope at west end of lake. A 22 shot, 600 yds. from them, caused all

Vicugna

December 10, 1951.

Huaylarco, 15000; Dpto. Arequipa

to run. 8 a.m., 20 on green flat $\frac{1}{4}$ mile SE of km. 133 (5 in one group prone, 12 in one group, 2 & 1 separate). Km. 132 $\frac{5}{6}$, 8:05 a.m., 200 yds. NW road, 10 incl. 3 juv. 8:45, 133 $\frac{5}{6}$, 100 yds. SE road gp. 14 (3 or 4 juv.).

December 11, 1951. about 2" soft wet snow in morning & on road 8:55 a.m., km. 136.95, 10 (3 juv.) at far edge flood plain SE of road at ft. slope. Three (1 juv.) 100 yds. SE of km. 137, the 2 groups 150 yds. apart. 9 a.m., descending squeaker from the 10 which hunched facing various directions. Faces wet back to point about 2" anterior to eyes  as if from snow. The 10 alarmed at me (in car on road) or the 3. Occasional 3 or 4 note call from the 10, then (9:05) 2 or 3 chirped at once & all ran 50' across & up slope (to SE) onto rocks & filed up steeper rocks to top ridge and on to SE. The 3 had taken alarm at about same time & run off to N, parallel to road; these ascended slope on NW side road at km. 137.1, & whistled at me, ²⁵⁰ 200 yds. away, when I stepped out of car. 9:20, km. 137.4, in wide draw to SE, group of 15 (no juv.?) 400 yds. away & 9 (2 juv.?) 100 yds. beyond. In draw to NW of bridge at km. 137.6, 11 about 300 yds. up the draw. 9:30, km. 138.3, 6 (1 pale juv.) on green flat just SE streambed at mouth E. Draw, & ~~6~~ (2 older juv.) at mouth W. Draw ~~and~~ and 3 ad. (part of group?) 50' from the 6. Half of snow melted by 9:30. 10 a.m., km. 139.1, 10 (4 juv.) groups watched a few days ago, near SE side streambed, 80 yds. from road. 8 (1 ~~lost?~~ juv.), up draw, 300 yds. SE of streambed. A juv., apparently or, diff. & an. A juv. moved $1\frac{1}{2}$ min. standing facing 135° from ad. ^{↑ a.} K. j. It held head under ad. chest,


Vicugna

December 11, 1951

Huaylarco 15000'; Dpto. Arequipa

away from trot, for several seconds about 1.5 ^{sec.} before and feeding. Ad. chewed cud, head up, ears back, during nursing. Terminated by ad. walking away. Juv. followed only 2 steps. Green mat mixed with cropped bunch grass at streamside where much feeding. One rubbed sides head alternately (5 strokes altq., one L, R, L, R, L) on a lump of green mat while standing. 10:40, one grazes 100' downstream from other (opp. km. 132), & 80 yds. downstream from it are 2 ad. (as a few days ago, the former 3?). The downstream one of 10 apparently ♂. It walked toward the 2 & they walked SE up slope. 10 ♂ ran toward them to 100'. Then 10 ♂ walked parallel to them up slope (territorial boundary about SE of km. 138.9. ~~go~~ The 10 band, minor ♂, walked 100 yds. SE up shallow draw toward the 3. 10:55, the 2 were 200 yds. SE of road. The 10 & 7 only 100 yds. apart. 11:10, 100 yds. NW of km. 139, 4 ad., a ♂ 50' from ~~others~~ + 10 yds. from slow-walking fox, the others also watching ~~fox~~ ^{fox} intently, necks + heads high, 2 with forefoot on 1' boulder to get more height. Fox over hill, all relaxed in 1/2 min. 11:10, 8 & 10 50 yds. apart. One of 8 rolled on grass; another lay prone (11:15). 11:19, ♂ of 8 chased 2 juv. 100' from its band; juv. back to 10. ♂ of 10 drove its group back a few steps it appeared, then tail up stood toward the 8 ♂. No more chase. The 8 ♂ big, lump at angle left jaw, pale band down left side neck, & lips constantly open. It grazed 20' from 10 ♂, then def. briefly & grazed ^{20'} ~~10 yds.~~ away, two main groups now 50 yds. apart, the 10 on less green more sloping part. 11:40, 8 ♂ still nearer the 10 than ^{to} own group, within 5 yds. of some of 10. The 4 (one prone 10+ min.) still 100

Vicugna

December 11, 1951. Huaylarco, 15000', Opto. Arequipa
 yds. NW of km. 139. Ad. ♀♀ have dark band ventrally from
 genitals to umbilicus (?). 11:50, 8 & 10 graze 100' apart.
 As many as 3 at once of 10 lie down or roll but no gen'l rest.
 12 M, the groups possibly graze within 5 yds. Juvs. of 8 smaller
 than any of the 10. About 12:15 the 8 wandered SE & the 10 SW of
 a low ridge so groups well separated. 12:30, 10 grazing stead-
 ily, 200 yds. SE of km. 139.1. Group of 9, no juvs., at head draw
 SE of broken bridge. // 12:40, at km. 138, 11 (5 juvs.) in stream
 lead to SE; 3 ad. 150 yds. SE km. 138.1 (the 3 part of
 former 5?); 6 (2 juvs.) 100' NW of km. 138.1 (compare
 with earlier today). Of the 11, 2 juvs. d. & w. (♀ & ♂), then ad. ♂
 same pile (12:45). ♂ of 11 has usual 3 pair darker spots or
 concentric in fur of throat; antero-lateral, about 6" apart, low-
 est pair just above white line.  1 p.m., the 3 & 11 70 yds. apart,
 the 11 ♂ farthest from the 3, all grazing. The 11 went to mean their
 ♂ & all retired SW to 100 yds. from the 3, 50 yds. SE of streambed.
 One of the 3 alternately walked a few steps toward 11 & stopped &
 looked, head not high or low nor tail up, until 100' from other 2 of
 its group. The 11 retired further; 200 yds. SE km. 137.9 at 1:10.
 1:20, the 3 ♂ run up to 40 yds. from 11 & they retreat in a
 group showing no fight (2 ♀♀ of 3 remain 100 yds. N of ♂).
 1:25, the 3 ♂, head low, tail up, ran to 5 yds. from the 11, then
 immediately ran 20 yds. away & stood (♂? of 11 had come
 out of group & stood toward 3 ♂. After 3 min. standing, 3 ♂ ran
 50 yds. from 11 towards own group & lay prone. 1:33, led by ♂,
 the 11 went quickly 50 yds. toward streambed. Two juvs. had a
 playful fight. 1:35, 3 ♂ run & grazed. 1:38, 3 ♂ d. & w. on pile,

Vicugna

December 11, 1951.

Huaylarca 15000', Dpto. Arequipa

then walked to 100' from his ♀♀. 1:40, the 6 about 100 yds. NW of km. 138.05. 137.5, in snow 400 yds. SE, groups of 12 (at) and 5 (at). 136.1, 2 ad. + 1 juv. in streambed feeding on thick grass flat. At corral SE of 136.3, group of 18, several inside the corral (1:55). About 4 of the 18 seem to be large juvs.

Dec. 12-15, 1951.

6 mi. SSE Imata, Dpto. Arequipa

Saw occasional groups of 8± at stream which would flow to low bare hills & desert flat to east of road when abated. About 4 groups between here & Imata, & about 4 between here & Paty junction.

December 16, 1951.

La. Salinas, 5 mi. W. Porvenir, 14200', Dpto. Arequipa

Last evening saw about 6 and this morning 17 on rolling sandy area where clumps of ichu cover 1/4 ground. Drove to Progreso & on toward Ubinas. 2 miles before Progreso, 9:45 a.m., saw 9, 2 or 3 juv., on gravelly sandy flat among bunch grass, 1/2 mile from lake edge; some wet as if had bathed. 6 1/2 miles beyond Progreso saw 10, 10:30 a.m., 3 juv., at edge green flat surrounding lake. 9 miles beyond Progreso, 5 on ichu flat, 10:50 a.m. Returning, 1.3 miles toward camp from Progreso saw 8 at 12:01 on gentle ichu slope. 3 1/2 miles from Progreso, sandy ichu flat, 10 vicuñas. 7 near camp, 7 miles from Progreso, on ichu flat, & about 7 there at 5 p.m.

December 17, 1951 The 7 (1 juv.) about 1/4 mile from spot of yesterday evening at 1 p.m. and 4:30 p.m. Saw none, but one high dropping pile, up to 15000± ft. best hiking toward top of Pichu Pichu.



Vicugna

December 24, 1951 El Huaylarco, 15000 ft., Depto. Arequipa
 Draw on ground. 11:30 a.m., about 40 in 3 groups 300 yds.
 NW of km. 133. 1:30 p.m., km. 138, 4 ad. (former 5?) on usual territ-
 ory 200 yds. SE km. 138 $\frac{1}{10}$. ♂ chased 11 (4 juv.) in West Draw,
 then the 4 descended into W. Draw. The 6 (2 juv.) 100 yds. NW
 of km. 138 $\frac{3}{10}$. O. Pearson took some manner of the 6, + of ♂ of 6
 chasing the 11. ♂ of 6 crossed road and chased 11, especially 1,
 downstream to 200 yds. SE of km. 138. ♂ of 4 ascended +
 gave brief chase too, + soon 3 ♀♀ of 4 joined ♂. 1:45, the
 11 200 yds. SE km. 137 $\frac{9}{10}$ + the 4 100 yds. N. of them. ♂/10
 overcast; fair E. wind. 2:30, km. 133 $\frac{1}{2}$, groups of 8 + 14
 on SE + NW sides road, 3 juv. in former + 5 or 6 in latter
 (1 small young). These groups joined 100 yds. SE road without
 altercation (mild alarm at car?).

December 25, 1951 8:15 a.m., km. 138, the 11 200 yds. to SE
 walking N. The 6 100 yds. NW of 138.1. The 4 200 yds. SE of
 138.2 in W. Draw. The 11 walked to stream 100' from 4. Event-
 ually only 10 yds. from 4, ♂ of 4 watching them closely. Then
 11 moved off to S. 50 yds. followed by 4. ♂ of 6 came to-
 ward road, watched the 11, + at 9 a.m. ran toward 11 and stop-
 ped 100' from them, the 11, followed by 4, running 100' away.
 ♀♀ + young of 6 ran downhill to ♂. O.P. photost some of this
 action + ♂ of 6 defec. ^{+ urin.} after chasing. 9:20, 100 yds. SE of 138.5,
 group of 35 ♂♂ with 4 ± juv. 9:30, km. 139, 45 ♂♂ 200 yds.
 NW, 10 (4 juv.) 50 yds. N., 8 (10 ± juv.) up draw 300 yds. SE.
 Found dead adult ♂ in prone position but head on ground,
 in W. Draw, several days dead, tale in side as if shot,
 + 5 corders on ground nearby.



VicugnaDecember ²⁷ 27, 1951Huaylarco, 15000; Op to. Arequipa

Took 7 still headchones, 35 mm, in morning. About 2 p.m., group 24 \pm σ σ at km. 138.5, 20 \pm at 138.8. The usual 6, 1 small young, in mouth E. Draw. Usual 4 ad. in W. Draw (is dead ad. σ the 5th - no σ σ now?). 12, perhaps all σ σ , at mouth W. Draw. This morning 16 near SE side stream at km. 137.7, 2 ad + 1 juv. 200 \pm yds. downstream from them.

December 28, 1951. About 3" snow on ground in morning, melting away before noon. Snow did not seem to bother vicuñas. Several with snow on rostrum. I took headchones of vicuña groups. Near km. 139 an apparent σ stood 25 yds. from stopped car looking at fox 25 yds. from it. Rest of group (6 \pm) unconcerned. Fox a σ & vicuña had been much closer - 10 yds. or less.

December 31, 1951. The 6 100 yds. NW of km. 138.1 at 7 a.m.

January 1, 1952 During steady fine rain, most were standing grazing but some prone. At about 137.5, 100 yds. SE of road the usual 2 A1Y. Continuous recent fast flowing tributaries have changed whole water situation since about Dec. 22. One chasing another jumped at least 7 ft. across stream, jumps starting in water 2' from bank. At 11:40 a.m., 3 ad. at foot of draw SE of km. 137, 200 yds. from our trailer. Soon after I walked about near camp, they walked up slope. 11:50, km. 137.3, 2 A1Y 50 yds. SE road. 137.7, 13 30 yds. to SE at mouth wide draw, grazing; no sure juvs. 10/10 sunb. - stratus & fair W. breeze. 12 M, 4 A2Y 50 yds.

Vicugna

January 1, 1952

Huaylarco, 15000', Depto. Arequipa

NW road at km. 138.1, grazing on abt. grass gentle slope. 12:05, km. 138.2, 2ADY 200 yds. to SE; then walked away to S. when car stopped on road. 3ad. in 5 territory, 200 yds. S. of stream of W. Draw. 12:15, km. 138.8, 7 (2 or 3 juv.) on SE side stream on ^{dark} green damp mat. 139, 4, no juv., 50-150' NW road, one 80 yds. from rest. Closest to road ran to others as car passed. 139.2, 10 (⁵ juv.) in green draw to east. These quickly walked & ran 150 yds. down draw. Rain commenced. Then hail, & within 1 minute 6 were prone facing same direction, ears back, tops heads at back level. All but 2 up within 1 min. after hail abruptly ceased (12:27). In rain & hail, heads shaken from time to time. One rolled on grass in rain. One feeds on $\frac{1}{2}$ " green grass growing on old fence mound. A juv. ♀ d. & w. at same time, then continues to w., w. at first in steady stream then in spurts. Some graze on green short grass slope which is sopping wet. Ad. ♀ d. & w. same pile as juv., then ran 50 yds. to join grazing group (which had moved). A juv. put neck in S, tail on ramp, or passed C' from ad. (or ??), legs somewhat bent. 12:37, juv. grazed 3' from same ad. - no reaction, but another juv. assumed the S-neck attitude when this adult walked toward it. Usually 5, seldom over 10 seconds lapse between movement 1 or more feet during grazing. In certain light, dorsal base rostrum of juvs. lighter colored than in adults. $\frac{1}{2}$ to all of juvs. sometimes together in grazing. The lips often vibrate, apparently slightly open & closed, about 5 or 8 per sec. when mouth is to ground. The position of rostrum prevents them from being

Vicugna

January 1, 1952

Huaylarca 15000', Dpto. Arequipa

rubbed in soil when feeding. 12:59, ♂ walked across the swift stream, 20' wide, opposite km. 139.1, & all but 3 (2A, 1 juv.) followed within a minute. Walking deliberate, lifting toes clear or nearly clear with each step. A ♂ juv. stopped & urinated in midstream. ♂ ran 50 yds. toward the & across road but did not cross. Juv. left on SE bank entered water & urinated (♂) in midstream, then returned to SE side. A truck passed on road; all but 3 recrossed to SE side stream. 9/10 overcast but bright. One ad. ♀ grazed as long as 2 min. before lifting head for a 2 sec. look. 1:15, 2 juv. crossed to NW side creek, going to depth halfway up tibias, one taking 2 or 3 jumps to finish crossing & other merely lifting forefeet high. ♀ ad. & ♂ juv. (black penis visible) def. & ur. on same pile, 3' apart, simultaneously. 1:22, ♂ across road to NW of km. 139.1, 4 juv. on other side road, other 5 on SE side stream. ♂ ur. on pile. Rain commenced & all but ♂ to SE side stream ♀♀ & young slid 50 yds. from stream. 1:27, ♂ at slow run went to stream & across to SE side, then grazed 50 yds from ♀♀. One classed juv. is older than others. 1:30, 75 yds. NW of km. 139 at ft. slope a group of 8, one a small juv., 2 or 3 others perhaps yearlings. The 10 (1:35) graze 50' N. of streamlet east of km. 139, spread 100'. ♂ of 10 raised head every 20-30 sec. (max. 60 sec.) for a quick (1-5 sec.) look. 1:55, of the 10, 3 juv., at least 2 ♂♂, d. & ur. on pile, then an ad. ♀ (25 sec. for d. & ur.), then another ad. ♀. ♀ stream lower velocity, thicker. Then ♂ on same pile. ♂ tail, up 45°, pulleated at rate 10X in 4 sec. during

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urination. 2 p.m., the 10 now 200 yds. ^{main} ~~W.E.~~ of stream are shallow green draw. The 8, 50' further NW up slope opposite km. 139. Occasionally one rolled on grass, ran, shook. 2:25, a ^{low} ♂, yearling?, crossed to NW side road near km. 139 + went to feces pile 100' downhill from the 8. Two of the 8 approached to 50', then all 8 walked away until 100 yds. uphill from young ♂. The latter d. & u., then moved pile + gave wolf howl, then grazed near pile. 2:32, a group of 19 (all ♂♂?) came down from saddle where 8 had disappeared. The low ♂ ran toward them, then away 100' as 3 ran after it, + it jumped atop a 3' high boulder + kicked back with both hind feet at another close to it. Chasers all appeared youngish. One, followed by another, ran 20 yds. down slope to the feces pile, + one d. or u. there. 2:35, the 10 grazing as before in km. 139 E. Draw. Of the 19, 50 yds. W. of km. 139, at least ^{prob. 5,} 3, appear to be juv. 2:45, ⁴⁵ 3 of 10 d. & u. on same pile, 50' S. of 139 E. Draw streamlet, simultaneously. 2:45, a ♂ ran fast down draw at the 10 + shared 1 bunch then another, the 10 moving 100 yds. to 50 yds. S. of tributary. Chasing ♂ then withdrew 50 yds. + defec. on pile. Then a juv. of 10 maneuvered 1 1/2 minutes at R. side of adult, withdrawing head 3x, adult standing with ears horizontally back. The ♂ withdrawing from 10 missed a second pile briefly, ran 100' up draw, then walked, then grazed. ♂ of 10 may have been down main stream + not with group at time of chase. at 3 p.m. it was 100 yds. toward mainstream from group, d. & u. on pile. It looked the

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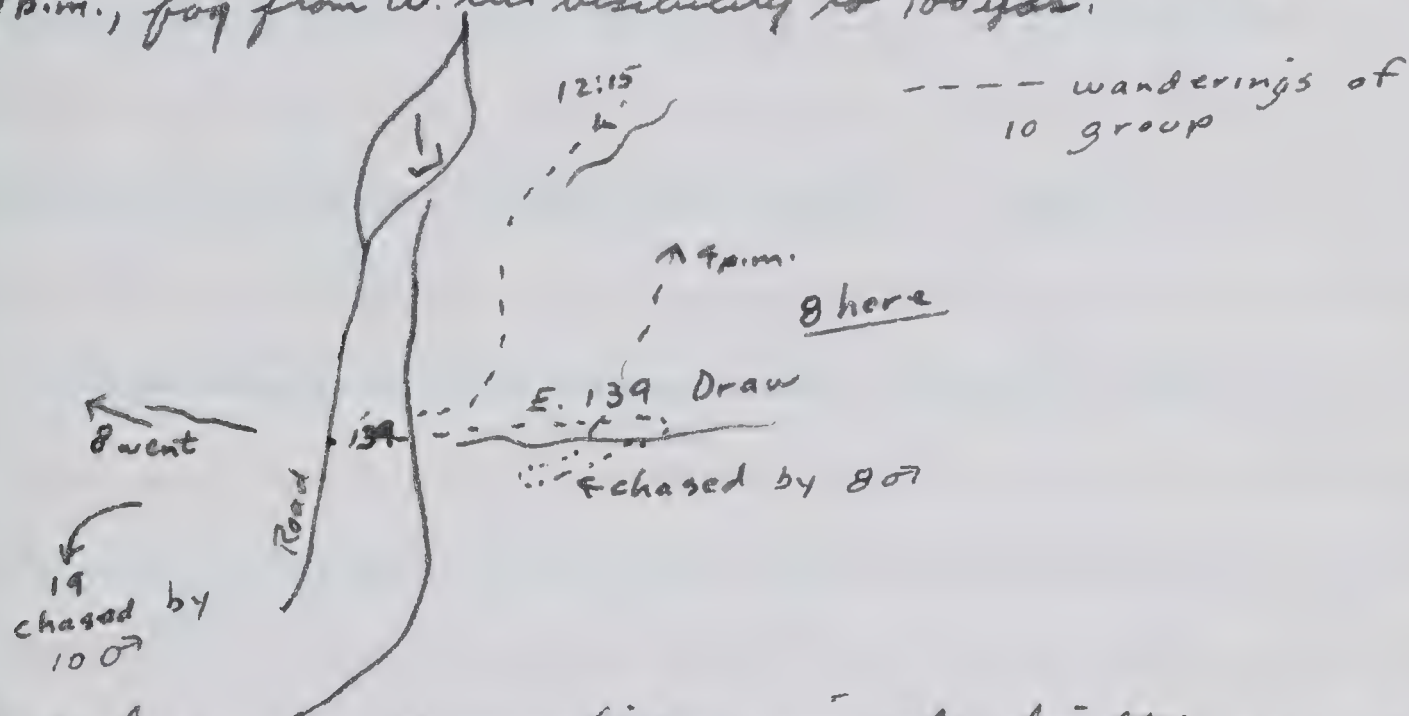
200 yds. across stream + road at the 19 (now 50' W. of km. 139) but then grazed. 3:05, 2 adults came W. and passed 50 yds. up slope (to S.) of ♂ of 10, who watched but did not attack. As the 2 came onto slope of main canyon, one ran ahead at group of 10 ^(when I saw 7 at 12:15) east of km. 138.7 + this 10 fled up the slope 50 yds. The 2 then grazed on green mat where 11 had been (territory of 2A probably). 3:15, 4 of the 19 had crossed to SE side road at km. 138.95. ♂ of 10 came to edge stream + looked across, then started across, but it was 3:18 before it ran at the 19 (delayed due to crossing stream?). The 19 fled up slope 75 yds. ahead of ♂. ♂ crossed road + pursued until 100 yds. W. of road, + stood, tail vertical, 50' from 19 (in close group). Then ♂ again loped at 19 + they went S. over rocky top of knoll, the 10 ♂ following. 10 ♂ had gone 250 yds. N. from own group to chase the 19. At 3:27, ♂ crossed road near km. 138.9 going back towards own group. I think ♂ went out of his territory in chasing the 19 but did not attack until they were in it. No fast chasing or approach within 10 yds. seen. 3:30, 10 ♂ not within 100 yds. of its group ^{just near a group of 8,} 200 yds. W. 139 E. Draw, ^{cf 8} a group of 4 (1 small juv.) - apparently ♂ which chased the 10 earlier came from this bunch. One of 8 ran a few steps toward 10 ♂ + it retreated 10 yds. (to 30 yds.) + grazed. The rest of group joined the 10 ♂ so 8 + 10 grazing about 50' apart (this seen early in December (or late Nov.) here). 3:40, the 10 about 50 yds. from 8 but 10 ♂ made a brief run toward 8 +

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stopped short, 10 yds. from them. The 10 worked W. up a gentle rocky slope, some of the 8 paralleling about 5 yds. farther E. 4 p.m., fog from W. cut visibility to 100 yds.



4:03, fog cleared revealing 2 juvs. of 10 fighting, rearing high. One facing across other with forelegs on its shoulder for 5 seconds. I drove down road. The 6 about where seen before noon - 100 yds. NW km. 138. at km. 137.6, a group of 11 200 yds. to NW. Hard hail commenced. Group ran 100 yds. across slope & all but 1 lay prone, facing downwind, within 1/2 min. 2 up again but all 11 down 1/2 min. later. Cars back horizontally; crumms below back level. Hail piles up on back, crumms, & anterior dorsal neck. ^{Two} groups of 2 side by side, others isolated, all 11 in 50 x 15' space on rocky mod. slope only slightly protected by a low ridge.

January 2, 1952. 7:15 a.m., 2 AIV 100 yds. NW road at km. 137.1. These on mod. slope & squealed when I appeared near camp. About ^{7:45} 7:45 drove up road. 8 NW of road at km. 138, 13 (about 5 juvs. - the former 11?) and 8 (1 juv. small). The usual 6 at road at km. 138.2, ♂ on SE side

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and retreating that direction while ♀♀ ran up opposite slope as car passed. Km. 138.6, 33 including several young. 10 at mouth of E. 139 Draw, & 9 (no juv.) to NW of km. 139.3 (seen there on previous days; ♂ of these chased for last shot). { About 11 a.m. near km. 138, saw 5 + 2 in lower W. Draw. One juv. nursed. One of 5 chased 2 downstream. 4 were in the territory of former 5, a 5. leading down from head W. Draw, & 2 juv. ^{sniffing} carcasses were feeding on carcass of vicuña there (see Dec. 25). This ad. ♂ had 2 curved upper & one lower canine (?). The 5 + 2 seen at 11 a.m. were both in W. Draw stream, fast flowing & 10' wide. One seen to spit at another. ^{5:50 a.m.} 5:50, calm, 7/10 cloudy, I was at km. 139.2 near broken bridge. The 10 (4 juv.) were at ~~at~~ E. side of the old road to bridge. Ad. ♀ def. - juv. approached behind & ad. held head high, annoyed. Then juv. def. same side. Then for 7 minutes there was vigorous play among 3 of the juveniles. They reared up & crouched, but hind necks, leaned necks on others back & forced them to knees (2 participating & one other nearby), then chased back & forth 100 yds. about 10x, one then another of 3 leading, sometimes one with tail out. Much of running very fast, & much on old road. At one point all 3 ran 10' into river above the bridge, then out again. Adults grazed during all this, then sat an ad. joined briefly & the juv. joined group in 1/2 minute. One juv. stood in squat posture with neck in S. & tail up while alongside ad. ♀, & latter flicked

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back at it with 1 foot when juv. was behind. 6:17 (watch
 prob. slow), all 10 to stream side of old road, 100 yds. E. of me
 (in car). One assumed S-stance and staggered as it app-
 roached face to face with an ad., then edged away. Two juv.
 def. + u. on pile at once, 2' apart. ♂ roared a note & gave
 "wolf howl", repeated, head quivering & lips shaking
 open & shut when muzzle high. Then all went across
 stream 15' wide in 6" water, walking slowly, ♂ third
 from last. A juv. had assumed S-stance & walked
 head on to 5' from ♂ earlier. Quickly they walked &
 ran up slope ^{to} 100+ yds. from stream, to east of
 km. 139.25 (to sleep?). Visibility still fairly good.
 Moved down road where at 6:35 (belt of Orion visible,
 no moon), 2 visible standing on a ridge, & at 6:37, 2
 others appeared near them & a squealing chase ensued.

January 3, 1952. at 7:10 a.m., 13 (5 juv.) in wash ab-
 ove culvert at km. 137.65, near where similar group yester-
 day. The usual 4A2Y at mouth of draw above culvert
 at km. 138.15. None apparent in W. & E. Draws. The 10 I watch-
 ed last evening were at 5:50 p.m. site at 7:20 a.m. on gentle green
 slope 80 yds. E. of broken bridge (km. 139.2). Across the road,
 50 yds. W. of km. 139.2, group of 9 (no juv. - seen this morn-
 ing). 11:20 a.m., the 10 halfway up draw E. of broken
 bridge (139.2). 8/10 cumulus. 11:32, 4A2Y on green flat
 at mouth W. Draw (km. 138.2). at head SW branch of
 W. Draw, 3 (1 100 yds. from 2), but the old ♂ not present.
 11:40, the 13 seen this morning now 100 yds. below same

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culvert (see 7:10 a.m.). A group of 18 on slope 100 yds. NW of km. 137.4. 7 p.m., km. 136.1, 4 ran toward stream from SE & 12 down road bank from opposite side. The 2 groups met & mixed & there were chases among them, several with tails up at once. Then all grazed peacefully together on SE bank. ~~Apparently~~ All ♂♂; only 1 small enough to perhaps be 1951 juv. One ur. while grazing at edge feces pile, another ur. on pile (no def.). 4:20, km. 133 1/2, 23 ♂♂ including 3 definite juvs. 150 yds. NW road. 18 at km. 133 mark. 7 on grassy flat 1/4 mile SE km. 133. The 18 had 5 juv., one as small as any seen; ♂-♀ group. Another group 5 just SE road at km. 132.9. When my car stopped at km. 133, apparent ♂ lead 18 150 yds. from road. Ad. ♀ & juv. ♀ def. & ur. 1 pile simultaneously, then another ad. ♀ & the tiny juv. - a ♂. Presence latter indicates this group built from former 15 in this territory. The 5 also ♂-♀ band, 2 younger (yearlings or old juvs.) than others. 2 juvs. in the 7. Some ♀♀ seem to have posterior abdominal area slightly sagging - perhaps a sign of pregnancy - but abdomens not bulging. The 5, disturbed slightly by car, moved to 100 yds. from the 7. 4 ^{grass} grazed 50' from some of 7. 5:15, the 18 on side of low hill 200 yds. NW km. 132.9 & just in shadow of hill. Only 2/10 cloudy & fair east wind. The 23 ♂♂ spread 100 yds. near where before, on gravelly flat 50% vegetated with low scrubby grass. A ♀ ad., ♀ juv., ♀ ad. def. & ur. same pile (of 18). Then juv. moved pile, gave wolf howl, moved pile, shook head. ^{so 2 ♂ juv. in 18!} Some of 18 roll, in shade. One rolled on low tola. Another panted ground before rolling. One of the 23 ♂♂, prone 5:23 -

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5:43^{53±} 5:48, smallest juv. of 18 wrestled necks with larger juv., then onto wrists & nipped at others' forelegs. Later "tiny" ran after & jumped forelegs on rump another. "Tiny" distinctly paler color than others of group. An occasional play-fight between 2 of the 23. 5:55, sun set behind clouds. Of 18, 2 (or +) ♀ ad. d. + u. same pile. One stood by other awaiting turn. Hind feet spread twice distance of forefeet /11\ . Sunset about 6:05. The 7 have moved further SE on flat - about 600 yds. from road. The 18 100 yds. NW hem. 132.8 on gentle half bare slopes where some clumps coarse fistula + other plants. 6:10, ♂ of tail up, 350 18, ran 300 yds. toward 23 (which gradually had approached to 400 yds.) and pulled up in short circle at fore pile, then circled there. The 23 had run when ¹⁸ about 50 yds. from them & stood 100 yds. from ♂. ♂ to another pile 100' closer, then stood with neck ^{+ ears} vertical. 6:16, ♂ pruned, tail up & head up, to 50' from the 23, & nearest of them retreated a few steps. 23 still spread 100 yds. One prone.

6:18, ♂ pruned parallel to 23, running with neck up, & stood with side toward them or facing away, ^{on fore pile (way} ~~front of 23~~ stand on there ^{up + moved off as} highest points on flat). 6:22, ♂ pruned at others of 23, which moved slowly away. No chases or head-low running. Ad. & juv. of the 17 of 18 band prone 6:22, but up by 6:24. 6:27, 2 of 23 standing side by side & wrestling necks, occasionally rearing, only 100' from 18 ♂. 3 of 23 prone on flat where had grazed. 6:30, the 17 still up "tiny" twice ran 10 yds. at a grazing juv. & leapt into the air, forefeet high, as it passed close

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To other 6:37, brightest point sky, 4 ft. candle.
3 of 17 prone; ♂ not back yet. 6 prone 6:40, 8 lay
6:42. I left + lay spotlight at 6:45 p.m. saw about half
of the 23 still up, some running about.

January 4, 1952 7:55 a.m., 6/10 series - station. Km. 137.25,

2 ad. + juv. (fairly sure ♂) at road, one ad. on NW side. Km. 137.5,
in mouth shallow draw to ^{SE} ~~SW~~ (E. 137.5 Draw) on slope of SW
side, 15 (5 juv.). 8:15, 17, ^(or probably) in head SW Branch W. Draw, there being
chased by one from E. The 6 (4A2Y) near stream opposite 138.4.
6 (one small pale juv., or small as "tiny of 133") at mouth of E. Draw.
One flat in W. Draw, in territory former 5, a group of 3 adults.
at the stream at 138.5, 8:30 a.m., 13 (6 juv.). There walked
60' from car (at 60 yds. at first), + grazed. One grazed ^{new} on green-
ery on fire mound. No reaction when 1 of 13 within 50 yds.
of balant of 6 in E. Draw.
ad. - mid. ♂-♀ band (the 13 seen near 138 a day or 2 ago?).
The 13 crossed to roadside of stream + on parallel to road
toward 138. Drew a whistle from 1 of the 6 in E. Draw, + one
of the other 6 walked 50' toward, into stream, but did not
attach. This by 8:40. 8:45, km. 139, 9 in draw to E. +
the ♂ of these 100 yds. W. of road (300 yds. from group) chasing
an ad. ♀ + ♂. Vibrating throaty friction - on - glass over as ♂ + ♂
stood 10 yds. apart. The 2 to W. up slope + ♂ of 10 back to
band. 8:50, the 9 without juv. at stream at 139.25,
about 400 yds. from the 10 (which grazed here one evening
about 2 days ago). At 12:10, the 6 still in E. Draw

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Just 200 yds. farther up, the 3 100 yds. S. of junction main + W. Draw streams. 200 yds. SE of km. 137.9, group of 10 (5 or 6 juvs. - perhaps more than - the 13?). The 15 in E. 137.5 draw, 100 yds. farther up than where earlier. 4:00 - 4:20, drove from km. 137 to 133 + could not find one. Men + llamas camped nr. Lgs. Peruna doubtless scared out.

January 5, 1952. At 5:50 a.m. of frosty morning saw 13 200 yds. NW km. 138, + 4 200 yds. NW km. 138.1. Frost on backs. Two or + llama trains went W. on road this morning so no vicuñas near road about 10 a.m. 12:20 p.m., 6 in W. 138.1 Draw. 3 (6 juvs) on bare hillside to SE of km. 138.3. 12:30, 2 ad. in E. 139 Draw. 4/10 white cumulus clouds + fair NE wind. Watched the 2. One prone 12:32, chewing cud at rate 8/5 sec. while other grazed 10' from. Perhaps the 2 which are usually about SE km. 138.8, here because owner of territory absent. 12:35, prone an up. Grazing on short greenery + around dumps Festuca. No change by 12:45. I moved to km. 138.3 to watch the 3, now at NE side of mouth W. Draw. Darkest one lay prone + chewed cud; up in 5 min. + grazed. 1 p.m., the 6 from NW of road ran to stream together, crossing about 138.3. One continued on 50 yds. beyond stream + drank at tiny puddle, some of others drank at clear stream, then all grazed on green flat, 150 yds. from the 3. 1:25, ♂ of 3 walked W SW + across tributary, def. on pile, continued to 150 yds. from group, + stood 50 yds. from ad. + juv. which had approached. They retreated + ♂ slowly walked 50 yds. back towards its group (1:30). 5 (2 juv.) at main stream opposite 138.2. ♂ of 6, 200 yds. away, stood staring at them. The 5 went downstream +

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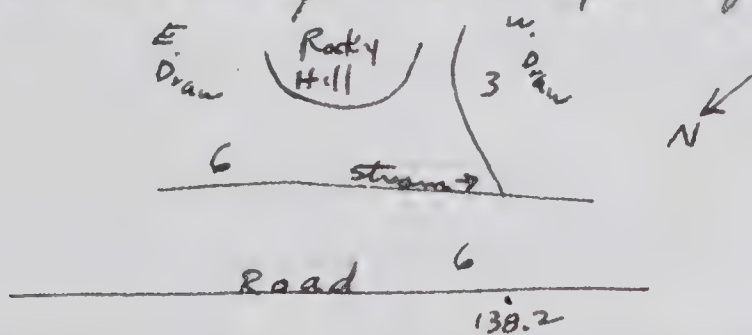
ascended bank & crossed road at km. 138 (there 5 from?).
 By 1:35, ♂ of 3 back 30' from ♀♀. ♂ larger, darker. The ^{whole} ~~male~~
 6 nibbles at new greenery on fence around. 2 p.m., the 6 only 50'
 from 3, this at same location where I had seen the 6 + 5
 close together without altercation on previous occasion. ♂ of
 6 walked toward a juv. which at 10' assumed S-stance &
 scooted into group. Several of the 6 graze on brown gravelly
 slope where, at this distance (200 yds.), no vegetation visible.
 ♂ of 6 def. & ur. on pile, tail pulsing. A juv. rolled on bare
 slope & went completely over dorsally. 2:30, ad. of 6 prone for
 5 min., then up & grazing. 2:40, ad. ♀ of 6 def. & ur. same pile as
 ad. ♂ had. Now 50 yds. from the 3. Then one juv. (♀) of 6 d. &
 ur. same pile. 2:45, ad. of 6 prone on bare slope, then on side,
 giving forelegs forward hick & hind backward hick, with
 neck & throat & chin on ground, ears nearly vertical. 1
 min. later prone, rolled over dorsally down slope, immedi-
 ately up, shook, walked off. The 6 walked along foot of bare
 slope, going NE, for 100 yds. (by 2:50). The 6 grazed spread
 50 yds. along base of hill. One ^{ad.} prone 3:05. // 3:10, km. 138,
 11 (5 juv.) - the same old 11? Km. 137.5, 2 A1Y at SE side road.
 138.7, 14 (4 juv.). At least 16 600 yds. from road in E. 137.5
 Draw. The 14, a ♂-♀ group, grazed on slope SE of stream
 opposite 137.7 (is this 13 seen last few days?). By 3:40, the 14, led
 by ad. (♂?), walked 100 yds. to top of slope & to SE along
 top. The 2 A1Y grazed alongside stream running to main stream
 from near 138.7 (NE edge territory?). At 4:40 I returned
 up road. The 11 again at km. 138, & this time ran toward

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stream from car rather than up slope to NW. The 6 were 100 yds. SE of km. 138.2, & the 3 150 yds. beyond (on SW side tributary). The 6 of E. Draw were on grassy flat 50' SE of main stream opposite 138.4. Only $\frac{2}{10}$ cloudy but fair NE wind.



07 of 6 near road ran, head low, to 50 yds. from 3; stopped, grazed, & by 5 p.m. moved to SW side tributary. The other 6 moved 50 yds. up E. Draw. Some grazing on short grassy coming up in fence pole.

5:10 p.m., 07 of 6 continues to graze 100 yds. toward 3 from its p.p.

5:12, the ♀♀ of 6 cross road & ascend slope to NW, the ♂ joining & joining them; they go 100+ yds. NW road. The 3 ascend slope to SE & over it (out sight). SW for 130 yds., then go to SE to ridge of SW Branch W. Draw, 5 (2 juv. - as seen this morning nr. 138) in extreme head of SW Branch. The 6 in E. Draw retired 200 yds. farther up draw.

No apparent reasons for these movements all 3 groups at about same time. (toward water site?) The 3 grazed about 100 yds. SE of the ridge.

I climbed hill NW of 138.3 & saw the 6 about 250 yds. NW of 138.3, in a grassy hollow. Alarmed at something, they went up a ridge, ♂ behind 50' & after looking toward road (not me), until 300+ yds. from road. The 6 in E. Draw went up slope at head draw & grazed on higher level, 600 yds. SE road. The 5 still at extreme head SW Branch. The 10 visible to SE of broken bridge (139.2).

January 6, 1952. 8 a.m., 5 (no juv.) 50 yds. SE km. 136.5,

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and 16 (same juv.) 50 yds. NW km. 136 (all ♂♂?)

January 8, 1952 at 2:10 p.m., three ad., wet as if had hatched, crossed NW to SE side road at km. 138.3, then on across stream and to NE side mouth W. Draw where one lay prone (the W. Draw 3?). About 250 yds. from road in E Draw, the usual 6 (1 pale juv.). Km. 138.8, 3 (1 juv.) at green mat SE of stream. Km. 139.2, the usual 10 (4 juv.) on slope 100 yds. SE of stream. The 10 moved into and up E. 139 Draw. One of the 8, farther up this draw, grazed only 50' from them, & rest of the 8 100 yds. from the 10. The 8 seem to have but 1 juv., a pale small one. By 3:50, the 2 groups only 30' apart. Occasionally we rolled on the grass & remained down a few minutes. One ad. of 8 grazed at S. side draw, 50 yds. from nearest of its group. 2:58, ♂ of 10 briefly shared about 4 of the 8, then grazed midway between the 2 groups (50 yds. apart). The groups drew apart to about 100 yds. One (♂?) of 10 grazed 100 yds. from its group, nearer the 8. By 3:45 p.m. the groups 200 yds. apart, the 10 200 yds. from the road & the 8 farther up the draw. At least 1 of the juv. of 10 a ♂. Some had sprawled on grass for a few minutes but no long or general resting. $\frac{1}{10}$ overcast 3:45 with thunder clouds approaching from S. 3:50, a group of 4 (1 juv., 1 yearling), at NW side road at km. 139.1. There walked across stream & were ²⁰⁰200 yds. from 10 before 10 ♂ ^{3:57}ran toward them. At 100 yds. distance the 4 started E. up a rocky slope, & the 10 ♂ stopped at a fence pile & d. & w., then grazed near the pile (4 to top hill). 4:01, the 8 ♂ started toward the 4 (now

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over ridge into ♂ territory), 100+ yds. away, stopping to d. & u. on a pile on the way. The groups sometimes only 100' apart, 10 ♂ usually near the ♀. At 4:30 the ♀ juv. of 10 gambled for 10 minutes. Once they ran up draw into ♂ territory & ♂ of ♂, tail up, ran at them & they retreated. Again juv. of ♂ walked toward the ♀ as if to join in the fun, but ♂ of 10 walked toward the group (3, juv. 1) & juv. retreated to adults. Racing alongside each other or chasing, sometimes in 2 pairs or sometimes 3 together. Rearing & clodding chests, then one with neck over others. Biting at forelegs. Tripping hindlegs with head. Mounting rumps from rear. Biting hind neck. No sounds heard. Adult occasionally lulled at one which came close. 4:45, the 2 groups 50' apart, calmly grazing one sidehill. Light rain 4:47. ^{until} 5 p.m., diligent grazing on slope of S. side E. 139 Draw, 50 yds. up from the tributary. All overcast, light rain, fair wind.


January 9, 1952. At 7:15 ^{a.m.} in E. 139 Draw, the 10 in bottom & the 8 200 yds. beyond on S. side. The usual 6 at km. 138.1, 100' NW road. 11 (4 or 5 juv.) crossing to stream side of road at km. 138. 5 (no juv.) 100 yds. NW road at km. 138.65. Km. 139.3, at 7:25, 7 ad. 100 yds. W. road & 1 chasing other groups 200 yds. from them (the 9th missing?). Stratus overcast, 1/2" snow on ground, some fog. At 11 a.m. hard hail, whitening the ground. 11:10, after hail, the 10 in E. 139 Draw on slopes of S. side, all prone. 11:15, 3 prone mouth W. Draw on slope 50 yds. SW of tributary mouth. 11 (5 juv.) on flat 200 yds. SE km. 138 - fringe of the territory of 3. The 6 100 yds.



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Huaylorca 15000; Dpto. Arequipa

NW km. 138, all prone with hail on backs 11:15, 3 up 11:20. // 1:50, 3 in W. Draw as usual, the 6 (2 juv.) at foot rocky hill between E. + W. Draw. E. of km. 138.8, 2 AIT on green slope. 50 yds. uphill from there a group of 7 (3 juv.) which walked off to E. soon after I stopped on road. The usual 10 + 8 in E. 139 Draw, 75 yds. apart + near bottom of draw. I watched the 3 near 138.8. ♂ d. + u. 2 p.m. ♂ snatched eyebrow with hind foot, 10 ± snatches, head low. Juv. grazed on green Distichlis mat where nothing apparent above the Distichlis. Juv. + ♀ 5 yds. apart, ♂ 80 yds. distant + lower on slope. 2:15, the 8 on green mat slope in E. 139 Draw, 300 yds. from road, spread 50'. The 10, spread 50 yds., more W. of them, almost 50 yds. away. 2:30, ♀ + juv. joined ♂ of 3. Heard fighting sounds, then saw 10 ♂ run to 5 yds. from 8 + stand there. // 2:40, group of 20 in E. 137.5 Draw, 1/4 mile SE of stream. I drove toward Arequipa + saw none until km. 133 1/2, where 2 AIT about 200 yds. NW road. Km. 133, 9 (3 juv.) 300 yds. SE road, + 6 (no juv.) 200 yds. SW of them. The 9 + 6 on same greenish area of Pampa Ritane. 3:25, some ad. ♀♀ + an ♂ juv. ^{of 9} def. same pile. 8/10 overcast + fair wind. Of the 6, 5 graze within 50 yd. draw, other ^(noted) 100 yds. towards the 9. 3:35, ♂ of 6 d. + u. on pile. Tail, curved up , pulsed 2/sec. during urination. The separate one gradually joined the 9 - so 10 + 5 in groups. At 4 p.m., the groups were 200 yds. apart. The 2 groups moved SE across the greenish flat about 4:10, nearly to far side of the green, but still about 300 yds. apart. By 4:20, the 10 onto ground only 10% vegetated. These groups about same at 5 p.m.

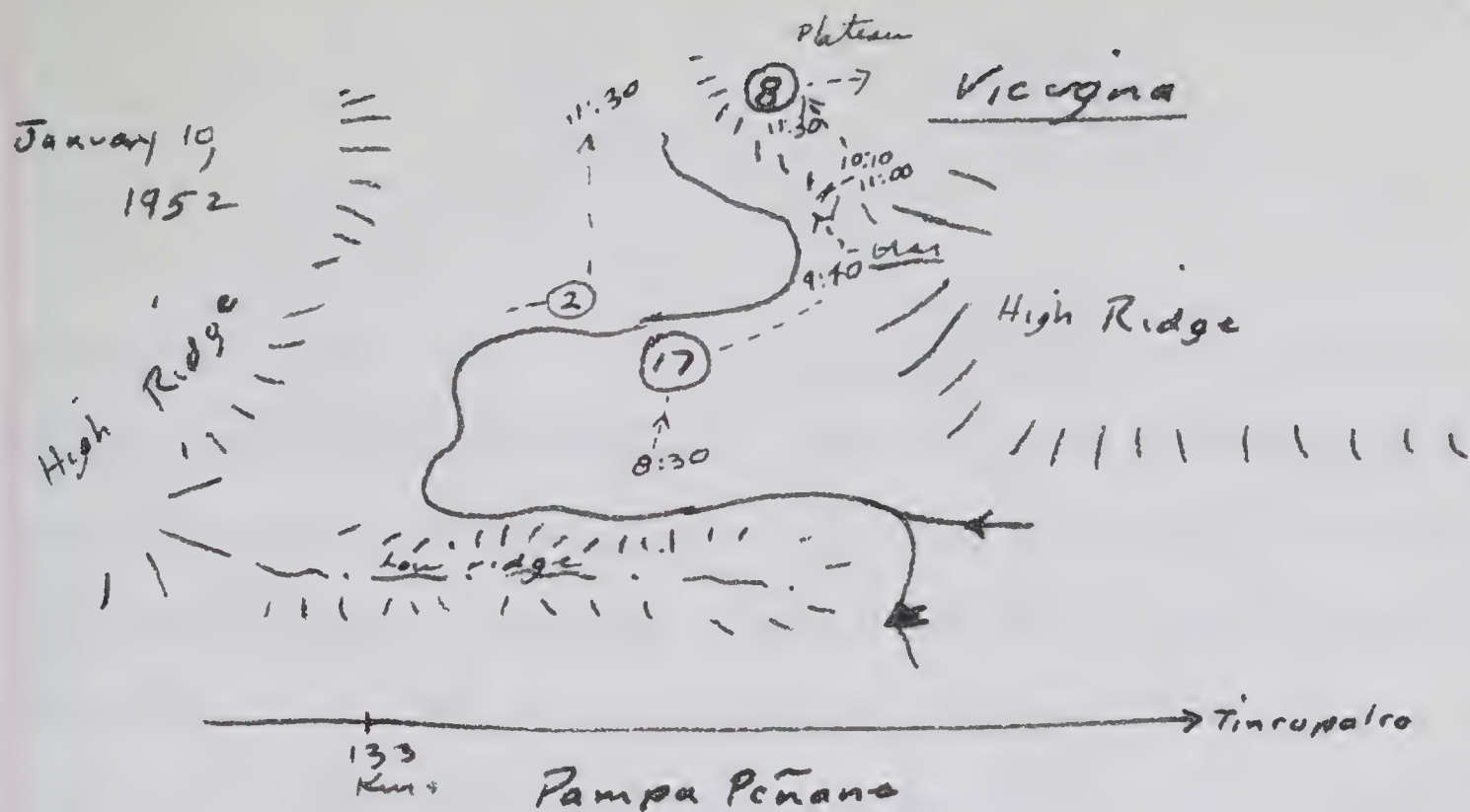
Vicugna

January 9, 1952

Huaylarca 15000', Depto. Arequipa

At 5 p.m. a group of 17, including "tiny," pale small juv. with light-tipped ears, at road at km. 133. The 17 with maximum 5 juv. $\frac{9}{10}$ overcast but bright. By 5:10, the 10 scattered 150 yds., the 5 $\frac{1}{4}$ mile S of them. Drove to km. 137 & saw on the way only 2, 200 yds. S of km. 133 $\frac{3}{4}$.

January 10, 1952. Overcast, some snow on ground. At 8 a.m. drove to km. 133. No vicuñas except as noted. The 5 on flat S. of km. 133 as yesterday. 8:15, about km. 134.2 one ran to NW from near road, then at slow run (5 m. p. h.) ran parallel to road. Another ran opposite direction on flat at foot hills & stopped. The one ran 70 yds. up side of hill and then gave it a wide berth. The one, stopping several seconds every 100 \pm yds., continued on along sidehill into mouth of a valley NW of km. 133 $\frac{1}{3}$. About 8:30 I was on a low ridge looking into this flat valley & saw the 17 (of yesterday afternoon) on $\frac{1}{3}$ vegetated flat in bend of stream, 300 yds. from road. They saw me on ridge & retreated 100 yds. farther from road. About $\frac{1}{4}$ mile beyond the 17, at higher level on $\frac{1}{10}$ vegetated ground, a group of 8 (1 small juv.). One (the 8:15 one?) stood 100 yds. from the 17 and at 8:35 ran towards it. One of 17 ran to intercept & chased the one past its own group. Tail of fleeing one up. It ran up onto sidehill 100 \pm yds. from 17 & one of 17 returned to its group. By 8:55 the one was 30 yds. from 17 & across stream from them, back on side from which ran at them. 9 a.m., the separate one crossed to the 17 but ran back across the stream, 6" deep, tail high, when 17 one approached it. The lone one perhaps a yearling. Some of the 17 near edge stream (9:10), the lone one 50 yds. beyond, grazing. By 9:25, a second had joined



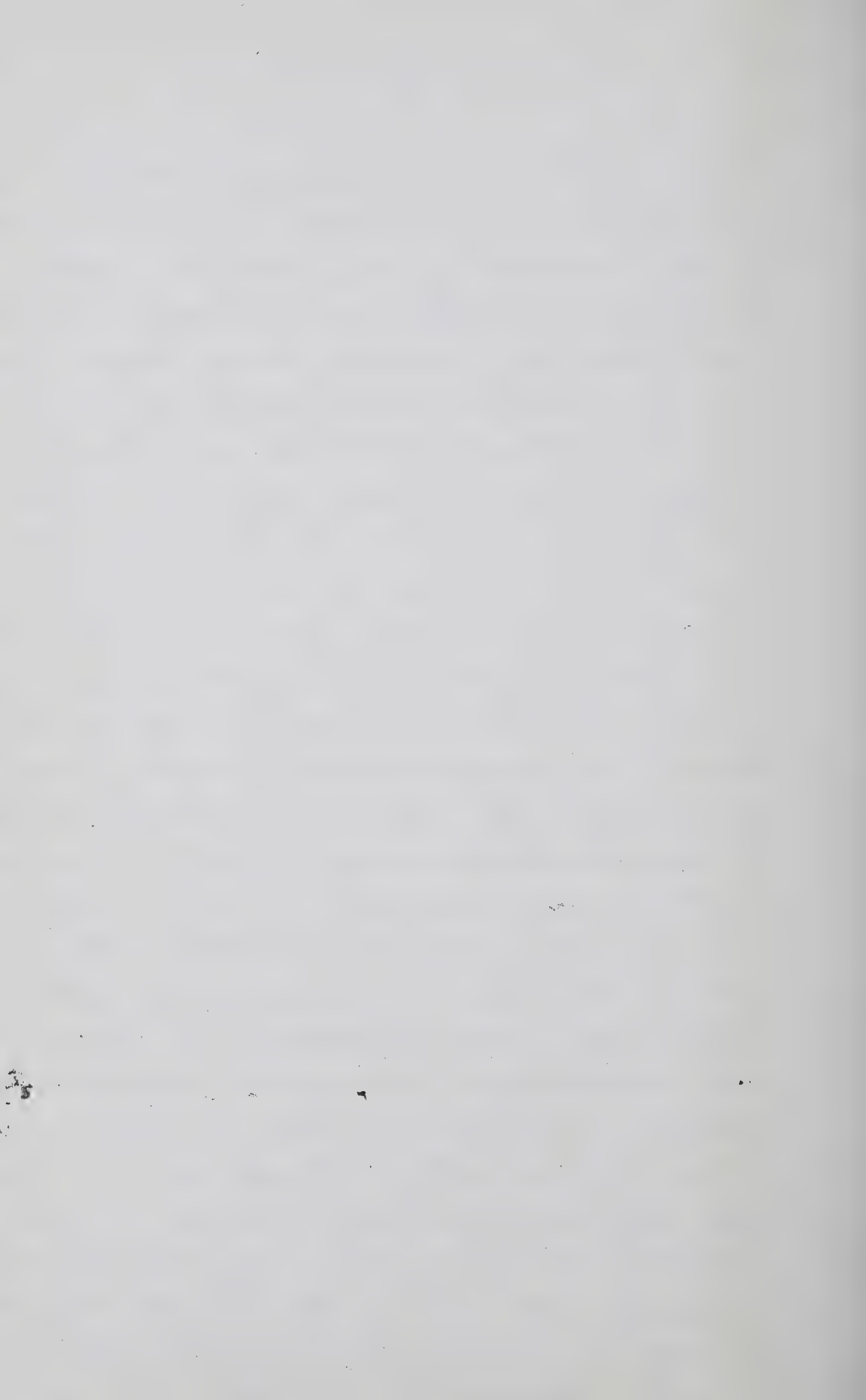
the lone one. "Tiny" several times assumed S-stance when next to adult, possibly trying to nurse. By 9:40, the 17 had moved on down the valley keeping on same side stream, now 150 yds. from the 2 separate ones. The 17 $\frac{1}{2}$ mile from road. Occasionally one rolled on grass or low tula, the soil being wet. One rolled, rose, shook head, then body. 3 crossed stream but returned to group after several minutes (10 a.m.). Most fed on nearly bare 30% slope. Occasionally one gave 3 scratches at soil, about 1 per second, with a forefoot, as if to uncover vegetation. 10:10, 9 of 17 atop 100 ft. slope on barren appearing plateau. Each forefoot used in scratching ground. As many as 5 scratches in succession given. 3 or 4 remained near stream but ascended bank to the plateau about 10:30. The 2 on ^{stream} flat now 200 yds. from the 17. 9/10 cumulo-status but fairly bright. 11 a.m., the 17 still grazing on the plateau near top of bank, the 2 300 yds. away on flood plain. About 11:30 the 17 & 2 moved farther from road - about $\frac{3}{4}$ mile. I went to spot where I saw scratching of ground. Trench 5" wide x 2' long at one spot, & 4 square feet plowed up nearly, to depth 4". Many young purplish rooted plants with elongated finely divided leaves littered ground (some collected & site photoed). On the plateau, gravelly surface, about 6-8 plants per

Vicugna

January 10, 1952

Huaylarco 15000; Dpto. Arequipa

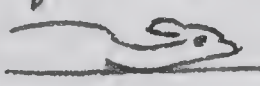
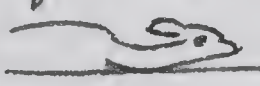
square foot, principally a purplish-white flower & cauliflorous like leaves, all flat on surface, about 3" diam. (coll. some). No signs digging near there. Back on low ridge 12:20. At 11:35 had seen the 10 of yesterday afternoon 500 yds. SE of km. 133 - about where last seen yesterday. At 12:20, the 10 100 yds. S. of that spot & the 5 50 yds. from them, half of each group lying down. A group of 5 from nr. km. 133½ ran to the 10, or coming 50 yds. to meet them, & these 5 ran past or into groups. Some mild chasing, tails of 2 or 3 vertical, & several times one seen to kick back with one or both hind feet at one behind. Then they grazed as a group of 15 (still at 12:35). The other 5 did not join in this melee. The new ones young ♂♂ or ♀♀? A single one grazed on pampa at spot from whence 5 came (133½). Another single one brown soil rolling barren area, ¼ mile SE of the 15. 12:43, the 15 + 5 all to near road near km. 133.1, & 10 ran W. parallel to road (3 juv. among them), these apparently being the 2 groups of 5. The other 10 (1 juv. - prob. original 10 - paused, then followed path of others but 300 yds. behind. Several minutes later I drove down road & encountered a dog, probable cause of the alarm, at km. 132, but no vicuñas. 12:55, the one 100 yds. SE km. 133½, prone; sex? - ad. Then at 134.6, 9 (1 juv.) 100 yds. NW of road. 136.9, 4 (no juv.) at foot slope across stream, only 150 yds. from camp (perhaps resident group). 11 2:45 pm, 15 (3 or 4 juv.) at mouth E. 137.5 Draw. 2:50, 3 200 yds. SE 137.9, all prone or if because of rain, facing same direction (SW). 138.3, the 6 at foot hill across creek, all prone, arranged



Vicugna

January 10, 1952

Huaylaray 15000', Dpto. Arequipa

In mouth ^{E. Draw} ~~W.~~ (= E. 138.4 Draw), 4 (no juv.), 80 yds. from the C. As hail started there lay prone -  chewing cud.  Ears back, basal half neck on ground. About 5 p.m., #3 in E. 138.4 Draw, 500 yds. from road, 4 (of 4?) chasing 11 NE along ridge, parallel to road. 138.2, the 9A24 100 yds. NW, the 3 250 yds. SE. 137.5, 11 80 yds. NW - ⁵ juv. This may be old km. 138 11 or 137.7 9. Pyrenophyllum & Festuca prominent on slope where feeding 14 ^{high} on slope of SW side E. 137.5 Draw, - about opposite 137.3. Of 11, 2 juv. in playful fight, hitting wrists. 2A14 100 yds. up slope to NW km. 137.25. Up a draw opposite camp (km. 137), 4, 250 yds. from stream (same as seen below camp earlier? All overcast, fair wind.

January 11, 1952. 8 a.m., at least 17 (no obvious juv.) on ridge NW km. 137. At km. 137.9, the 11 (5 juv.). 138.2, one atop rocky hill to NW & 5 in draw beyond, the one ^{apparently} ~~prone~~ looking at 28 at mouth E. 138.2 Draw on NE side. About 4 appeared to be ^{near the} standing stiffly 50' from group. juv. One of 28 a big ♂, prob. of 3 from farther up the draw, 7 of 27 prone on barren slope. Half group walked across slope of Rocky Hill going NE (8:10). The leading group came back around hillside 8:20, a big ♂ 30' behind them, tail up, but not pursuing closely. All were up, but 10 prone on bare slope 8:22 (sunshine there slowly). 8:25, only 7 of 28 standing, others scattered prone or (3) on sides on bare slope. One d. & u.; ♂. About 6 are full long-headed adults, mostly youngsters appearing. Only 4 up 8:28 (sunny, but brief hail about 8:15). Several in territory of C. 8:39, 7 up, others spread 200 yds., about 7 of 28 on green gentle slope at foot of barren hill, others among boulders. Two d. & u. same side,

Vicugna

January 11, 1952

Huaylarco, 15000 ft., Depto. Arequipa

3' apart, simultaneously, facing 45° apart; ♂♂. Another d. + u.; 35 sec. from fall first blob (urine started 5 sec. later) to first step away. All but 3 up by 8:40, nearly all at green foot slope. 2 young ones wrestle playfully: neck over others & drop to ^{wrists} ~~lower~~, forcing antagonist down; head under chest & trip forelegs, defense being to drop to ~~lower~~ wrists; biting at wrists, defense being to draw wrist back & drop to wrists; rearing up to get neck over that of adversary. 8:45, 2 ♂ d. + u. on pile 5 yds. apart, diff. from ~~the~~ formerly used pile 100' away. 8:46, ♂ (of 6?) to stream near 28, then across & to SW end line, the group moving away. Head of 6 ♂ high, tail up, no stray attack. This ♂ ran back across stream (8:47) as if after another group out of my sight. The 28 continued grazing. 5 min. later I found the 6 ¹⁵⁰ 200 yds. up slope NW km. 138.5. at km. 138.8, a group of 40 ♂♂ at stream. 6 or 7 juv. Several grazed 70 yds. from car - tower than ♂-♀ groups. Some waded ankle deep in stream & nibbled grass head on bunches. A juv. 10' from ad. assumed S.-stance; ad. ran at it, then juv. ran to rear ad. & ad. away a few steps. Occasionally one blew at another. The group ahead moved 100 yds. downstream [nos. 5 & 6] by 9:15, 6 on road side stream (took 2 photos, b. & w.). Occas. one d. + u. on pile. One stopped at pile only 5 sec., let 3 blobs fall. Then all to SE side stream & grazed on green slope in a ragged line along contour (9:25). 7 walked & ran 100 yds. across & up slope, tails up, as if seeing a fox, then returned to group 9:35. 9:45, a playful fight started between 2 at least 2 years old. At first biting of wrists & backs neck & putting neck over other's & bearing down. One hit on ear of

Vicugna

January 11, 1952

Huaylarco, 15000', Opts. Arequipa

another. One down onto belly when other put head under abdomen. Grunts & guttural growls. Fight got fiercer. One chased another, beside & behind, mouth open nipping at wrists. Harder biting of hind necks. Head under belly seemed especially provoking. Mouths constantly open. Neither seemed to have advantage, both biting & defending at same time. Continued about 8 minutes in all, then stood 3' apart facing opposite direction, lips of one & jaws of other agape. Stood thus, ears back, very still, for 3 minutes, then one walked 5 yds. & lay prone; the other lay prone 10' from first (9:56). Twice during fight a 3rd, about same age, ran to the 2 & engaged a bit. 10:05, several, tails up, ran & walked fast several yards. Then 2 (youngest est. almost 2 yrs.) engaged in brief fight. One held muzzle high with vicuña hair in mouth & spit into air 3x while other had head over bare neck. By 10:07, grating throaty cries almost continuous, some chasing, action faster & harder. Many of others watched fighters. Another milder fight started. When one closed, chaser sometimes puts head over shoulders loader, or nips at forelegs or shoulder. Fleeting one kicks back, sometimes flinging whole rear into air & sending heels to height of head. The main fight stopped suddenly 10:12 & milder one continued (2 about 2 yrs. old). This too developed into much running & crying (10:15), then suddenly stopped, the 2, lips agape & dripping, standing stiffly 10' apart. The 40 at about same rate as at 8:35, occasionally 2 or 3 prone on slope. This is territory of 2 A14 but these have not appeared. By 10:25, the 40 had moved into bottom E. 139 Draw. 8 (2003 juv. - the former 10?) were in Broken Bridge Draw, & 07 ran to 200 yds. to brow of hill

Virginia

January 11, 1952

Huaylarra (5000'; Dpto. Arequipa)

& watched the 40. A group of 7 were atop ridge to N. of the 8, & ♂ had been watching these & stalking toward them. The 40 worked up E. 139 Draw to edge territory of 8 (1 juv.). 10:33, ♂ of 8 (2 juv.) went on to the 40 & began herding them, 1/4 mile from his group. Group moved up Draw into 8 (1 juv.) territory, & at 10:36 ♂ of 8 on brow of hill 200 yds. from its group. ♀ ad. of 8 d. & ur, squatting 4" deeper for latter. 10:39, the 40 had started up N. Branch E. 139 Draw, but now driven S. by one with head & tail up by mild chase of groups & standing & staring at group. 40 back down draw, & ♂ of 8 (2 juv.) to them again (10:43) while ♂ of 8 (juv.) stood on low boulder 100 yds. up draw. A fight between pair in 40 ths close to attacking ♂. One put head under belly of other & hind legs thus unable to run for 3rd sec. 10:45, the 40 on ridge between E. 139 Draw & S. Branch. Then all ran 50 yds. SW along ridge, then stopped & faced back, at least 15 with tails up & several on boulders or with forefeet on - fox? dog? Nearly all 40 over ridge (to SE) out of sight. 10:50, ♂ of 8 (2 juv.) loped 300 yds. toward ^{its} group & stopped 200 yds. short of them. In running, head up, head stays at same level but moves forward as forebody bounces up - thus head steady while chest moves up & down. 10:55, ♂ 100 yds. closer to its group. If these be the former 10, they have lost 2 juv. - ♂ or ♂? 11:03, about 7 of 40 visible on ridge S. of E. 139 Draw, & 4 ad. (3 met) walking up S. side this draw, ♂ of 8 (2 juv.) staring at them. These 4 same as seen W. of 139 at times? The 4 ascended ridge to S. but soon ran down, pursued by an adult, & were chased up N. Branch. About 16 of the former 40? followed same route soon, & (11:14) a group of ⁴⁷ 45⁺ were driven



Vicugna

January 11, 1952

Huaylarco, 15000', Dpto. Arequipa

E. about 500 yds. SE of fork of E. 139 Draw. ♂ of the 8 remained on slope 150 yds. S. its group (11:15). 9/10 cumulo-niveline. By 11:25, ♂ ⁵⁰ yds. from rest of 8. ♂ gave whistling descending warble & stood with feet on a boulder (1' high) & stared downstream. The group raised heads, a prone one (20± min.) rose & joined, & all stared. More whistling. Group lunched & joined ♂. A shaggy black dog appeared 300 yds. downstream. It continued trotting upstream paying no attention to the vicuñas & passed 150 yds. from them, they being well above on slope. After dog passed, the 8 went 50' farther up slope (11:35). A few minutes later all 8 walked S. along slope to edge E. 139 Draw. || At 1:15, drove down road from 137 & saw none until 134.1, where 9 (1 pale juv.) at edge flat to NW - apparently resident group. 133.7, lone adult 100 yds. NW. On grass flat SE of 133, 10. I shot a goose 200 yds. from them & soon the 10 ran off in a bunch to SE, over barren rolling ground towards hills ½ mile distant. 2:15, the 9 as before, but no others seen on way back to km. 137. Rain & hail. || 4:05, 4 (1 juv.) saw across stream from camp.

January 12, 1952. 6:50, 2 A 18' 100 yds. NW km. 137. In SW Branch E. 138.2 Draw, 2 ad. (only 2 seen yesterday). In E. 137.4 Draw, ¹⁴ ~~4~~ on SW side, ²⁵ ~~35~~ (♂ or ♀ prob.) on ridge of N side (there the 40 of yesterday?). About 10 a.m. I was ½ mile ^E of km. 140. The E. 138.2 Draw opened up to wide flat green wet bottom, about 1 mile from road, where there were several bunches of vicuñas. Few on rolling hills. About 12 M, 11 (5 juv.) just above bridge at 137.65, nearly all adults wet below.

Vicugna

January 12, 1952

Huaylarro, 15000', Dpto. Arequipa

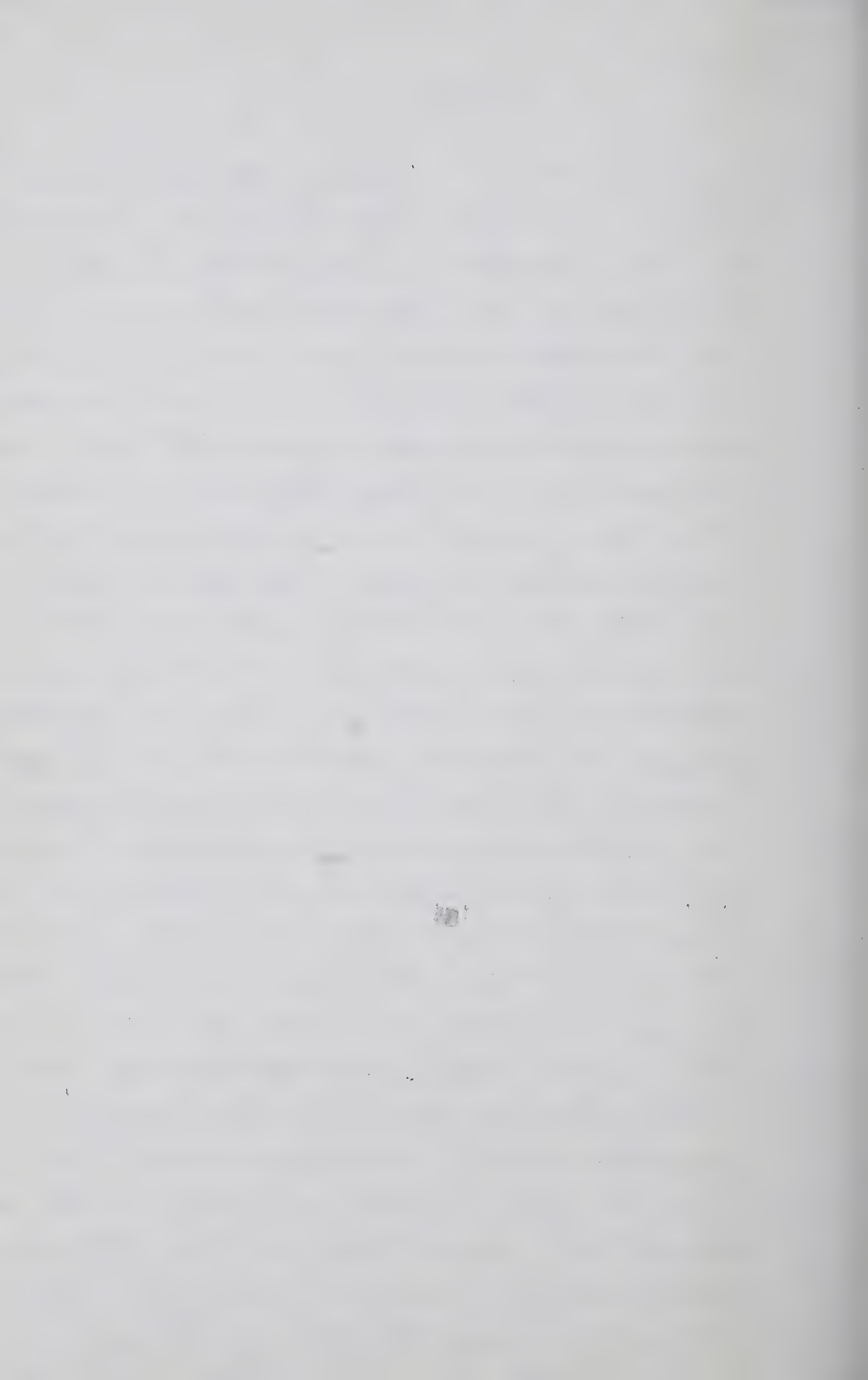
a juv. ran down slope & bucked both hind feet back & high into air. Two juv. had playful fight. At 1 p.m. returned & found these 150 yds. S. of 137.6. All overcast & thundering. Only 1 juv. lay prone in light hailstorm 1:05. Only 1 juv. appears wet. One ad. blew at another, other standing in front, its head 8' from rear one & front one facing away. Muzzle held high & cheeks in & de-flate during the blowing. Nothing visible spit. Front one kept muzzle up too but blew into air only if at all. A juv. ♂, then ad. ♀, d. & u. on same pile in turn. Another ad. ♀ d. & u. Dorsal lip anus out & during defec., distal $\frac{2}{3}$ tail vertical. 1:21, led by an ad., all went to SE side of ^{stream} bed & grazed, leader on green Distichia mat. None prone during 2 min. hailstorm but occasionally flicked ears. The bunch ascended SE bank. 4 juv. wandered 50 yds. SE of rest. One nased feces pile, shook head; then 2 urinated there. Then the 4 juv. ran 100 yds. SE. onto rocky slope, then down & on 100 yds. around a point of hill, then back to group fast, then out & back again, 4 again (by 1:36). Leader in one chase back lagged 10' behind others in running out again - a kind of tag? Those chasing sometimes put head to hind legs or side of the leading one. One mounted another from rear for 2 sec. Three juv. in play fight. A juv. ran back to adults, slowing to walk & assuming S-stance as approached, then, 5' away from ad., went down onto wrists and very slowly sank to knees. Up 15 sec. later. Only juvs. do this! 1:42, all 11 in bottom E. 137.5 Draw, 100 yds. from stream. An ad. ♀ ur. on a pile. a juv. ♀ ur. on another 50' away. The 5 juv. together 100' from rest of group. 1:52, 2 more ad. ♀ ^{d. & u.} ~~defecate~~ on one pile in turn. The

Vicugna

January 12, 1952

Huaylarco, 15000; Dpto. Arequipa

group near 1/4 mile from road; at point of rocks of NE side of the wide draw. 1:58, the group out of sight behind a low hill. 2:10, 38 on SW side of mouth E. 138.4 Draw. These went across slope & down to mouth E. 138.2 Draw. Most resident groups apparently driven out by llama trains this morning. 2:25, 2 ad. across stream opposite 138.8. I walking on road, & as the 2 came into view one ran toward me 50 yds. ^{to} ~~near~~ nest rim & whistled at me. These 2 did not leave as I walked up road. The ♂ (juv.) as usual at fork E. 139 Draw. a group of 4 in draw 200 yds. NW km. 138.3 (4A2 territory). 2:50, more ♂♂ had come down E. 138.2 Draw so that about 75 in the draw at once. About 40 were chased to SW, at 2:55 were at 137.6, & then going up slope NW of 137.5 (still at 3:05). 3 p.m., 34 ♂♂ scattered in head E. 138.2 Draw. A male, tail up, apparently 1 of 2 inhabiting SW Branch this draw, chased them into a group & herded them up rocky slope at head of draw, going E. Once ♂ ran up SW Branch as if to chase! there & latter raised its tail at 50 yds. ♂ stopped (its mate) & went down to bottom draw again. While ♂ herded the 34, this other one descended to flat of E. 138.2 Draw & grazed. Mostly the ♂ merely stood 50' behind the group & they moved slowly away, grazing, in ragged line. 3:09, the 40 are 200 yds. up slope NW 137.5. The 34 seem to have encountered a big ♂ on E. side ridge, so they go NE, but ♂ descend to head E. 138.2 Draw. The ♂ of 2 had fec. on pile near ♀ at 3:10, then walked to 50' from the ♀, tail up. The ♂ crossed tributary & ascended ^{slope} going SW & ♂ returned to grazing. Overcast, clouds - numerous. These 2



Vicugna

January 12, 1952

Haylarco, 15000; Opto. Araguaya

are remains former 5 in this territory. 3:28, ♂ of 2 went 100 yds. toward 2 approaching from SW, but then passed 100 yds. toward road from him. The 2 into 6 territory & def. & ur. on separate piles near foot Boddy Hill (ad. ♂ + ♀), then walked on NE to mouth E. 138.4 Draw & grazed there. Rain commenced. 11 ♂ (♂? ♂?) on slope 200 yds. SE 137.7. Hail commenced. Some turned heads downwind & held them low. One prone within 15 sec. after hail commenced, then 2 more, almost touching first. A big ♂, tail up, came & began to herd group, but only 1 of prone rose, & soon ^{big} ♂ prone 10 yds. from group of 6 prone ^{↓↓↓} ^{↓↓↓}, & 2 others prone 10 yds. from big ♂. After 3 min. hail turned to rain. Big ♂ walked after the 2 & they walked away up slope, while 6 remained prone. The 2 followed closely (5 yds.) & unobtrusively by big ♂, wandered off up & across slope. 3:50 (10 min. after storm started; still ^{raining} ~~hailing~~) the big ♂ stood by the 6, & 3 rose. Then big ♂ walked off. All 6 soon up & walked across & up slope in rain. The ♂ went down to mouth E. 137.5 Draw & ^{big} ♂ to them; then (3:55) big ♂ walked to its group, about 10, all prone, 50 yds. NW stream near km. 137.7, & the ♂ walked up the E. 137.5 Draw. Storm continued as rain & wet snow. About 4:30, 3 or 4 in draw opposite camp. Storm stopped but snowing resumed at dark.

January 13, 1952. About 7:30, 4 in draw across from camp, then apparently ad. ♂ + ♀, yearling, & juv. 8:35, 11 on flat 200 yds. SE km. 137.9 (11 of yesterday p.m.?). Km. 138.2, 4 (no juv.) 50 yds. SE of road. There the former 6? Km. 138.7, 2 across creek as usual. 138.8, 40 (or a few more) at road. A big ♂ from up road attached & herded them up slopes. 5 near foot



Vicugna

January 13, 1952

Huaylarco, 15000', Dpto. Arequipa

of E. 139 Draw - no juv. 8 + 2 ^(no juv.) 50 yds. NW of 139.1 (^{two} ad. ♀ - then the 9th from 139.3?). Loss of juv. from 6, 10, means all juv. driven out before birth new young? 9 a.m., km. 140, a group of 18 including 6 juv.; 3 def. + urin. - ♂♂.

January 14, 1952 about 4 p.m. saw 5(♂) + 8(1 juv.) in E. 139 Draw.

January 15, 1952. 3:55 p.m., 11(5 juv.) 100 yds. up draw from 137.65 bridge. 4 p.m., all across draw + up slope, one ad. (♂ prob.) 50' in rear + occasionally stopping + looking farther up the draw (dog?). Dog seen near where disappeared (to NW km. 137.5). No others visible from road to 139.3 + back to 137. at 10 a.m. 7:30 a group of 21 across stream from camp.

January 16, 1952 Ground wet from rain + snow last night, stratus overcast, showers. 7:50-8:10, from 137-139.3, saw: 137.5, 2 A 150 yds. toward stream. A group of 12 in E. 137.5 Draw, 200 yds. above stream. 138.1, 3 A 100 yds. NW + apparent ♂ returning from across the road where 5(1 juv.) on flat near mouth E. 138.2 Draw (buildup from the 2 or 3?). On NE ridge E. 138.4 Draw, 18(α+), prob. all ♂♂, & across stream from 138.8, 12 on green mat slope (a favorite spot). In E. 139 Draw, 5(0 juv.), apparently remnant of former 10. Drawing lightly 8:10 a.m. Of the 12 at 138.8 (8:20 a.m.), no apparent juv. tho at least half appeared to be yearlings (will be called 2-year olds when new juveniles are born). 8:25, ♂ at 138.4. Two big ♂♂ herding the 18 (one seen to be 20), tails up. One big ♂ returned to 3 ad. at foot of Rody Hill, then all 4 (the old 6 probably) worked 5 a along slope. On floor E. 138.2 Draw, 3 A 15 (8:35). ♂ of group A d. + u. on pile. Sky

Vicugna

January 16, 1952

Huaylarco, 5000', Depto. Arequipa

brightening. One of the big gray-headed plume constantly calling + flying near A. ♂ ran a few steps forward as plume swooped behind. (ptiloscelys)

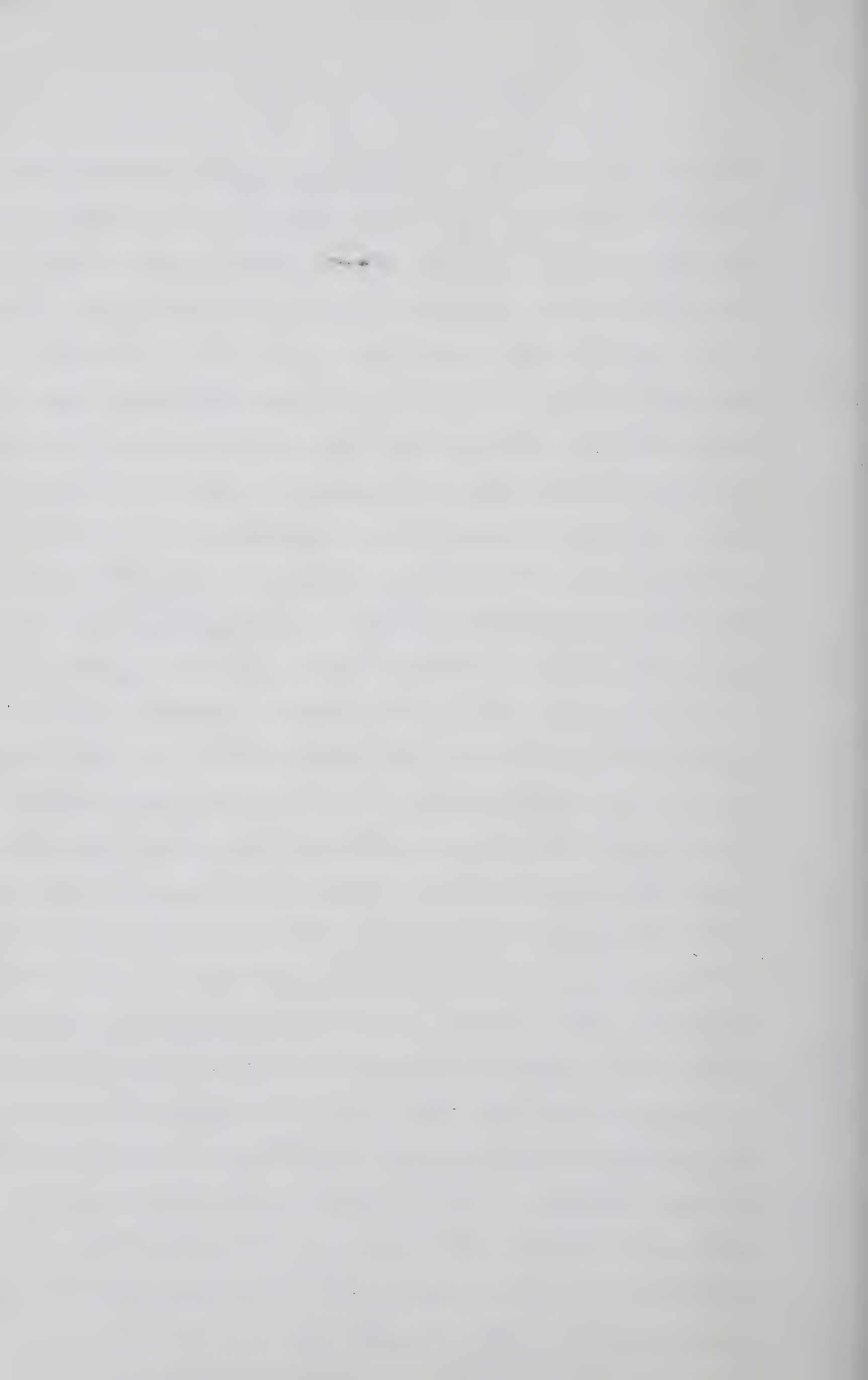
8:39, group A looks at B, 70 yds. away. 8:41, ♂ of A defec. on another pile 100' from first, only 100' from B. 5th member B 50 yds. up draw from others. Ad. ♂ ♂ + old ones ^{have} ~~seem to~~ heavy transverse ridge just anterior to eyes. 8:44, A ♂ def. on a pile near its ♀♀ - 3X in about 10 min. 8:55, A ♂, now 150 yds. N. of ♀♀, again d. + w. Tail thrashed 10/4 sec. during urination (heart rate?). The 20 ♂ ♂ (now only 16) again chased toward stream along NE side E. 138.4 Draw by one with tail up. 9:15, a large llama train came ~~up~~ road. When they were at km. 138.1, the vicuñas took alarm. A went ^{up +} across slope of Rocky Hill followed closely by B, all down to bottom E. 138.4 Draw + up the other side where, joined by the 20 ♂ ♂, all went up ridge going SE. 9:40, the 12 as before in E. 137.5 Draw, grazing on flat ground. By 10:15 ~~it~~ this group was 15 (some juv.), spread 150 yds., 200-300 yds. up draw from stream. 10:30, below corral opposite 136.3, a group of 15 grazed on short greenery between clumps of spring ichu. I continued on to km. 133 where at 10:53, a group of ⁶ 11 + ¹² 4 on green flat ¹⁰⁰⁻²⁰⁰ ~~100-200~~ yds. SE km. 133 post. Last vicuña 1/4 mile SE road at km. 133 1/2. Of the ⁴ 11, ⁴ ~~5~~ juv., none seen in the 6 (one ad. ♂?, between groups). I watched the 11 + 4 from road. 4 of 6 prone at 11 a.m.; 2 on sides, necks up, 11:05. Diffused sunshine. One of 6 rose 11:06, another 11:07. 6 geese flew near the 12 (now together), & they gave a start, & prone 2 of 6 rose (11:18). These geese evidently the 10 + 5 of a few days ago. 11:25, a ♀ of 6 d. + w. on pile, then acted alarmed as ♂ approached. ♂ nosed pile + goose

Vicugna

January 16, 1952

Huaylarco, 15000; Dpto. Arequipa

"wolf haul," then d. + u. The 2 groups 100 yds. apart. ♀♀ budge down ^{til 11:50} at posterior sternum - pregnant? 11:40, one of 6 down, rolled, stayed prone. 11:51, a ♀, then another ♀, of 6 d. + u. same pile. Another ad. ♀ at 11:54. 11:57, 2 of 12 + 1 of 6 lay on side. 12:01, 4 of 12 + 3 of 6 lying down, all on side. 12:03, only 2 each group still down. Some thrashed on side before rising. 12:04, last of 12 up. All up 12:06. 12:08, one of 6 lay on side, neck on ground. Another 12:12, 4 of 6 down by 12:17, but only 1 of 6 down 12:18 & it up 12:14. 12:25, rain + hail fell, 2 of 12 + 4 of 6 quickly prone, tops heads below ^{but 2} back level. 12:29, all of 6 + 8 of 12 prone, ^{all} facing away from storm. 12:32, all but 1 of 12 down, 10 in space of 25'. 12:35, rain let up; 2 of 12 now up, 2 more a minute later. 12:38, only 2 of 12, & all 6, still prone. 5 of 6 up by 12:41. 12:43, 4 of 12 + 2 of 6, & a lone one which ~~came~~ ^{came} to 100' NW 133, prone again as hail + rain resumed. Then all rose & the 6 ran toward 12 as llama train ^{up} came along road at km. 132.0. The 6 + 12 kept separate & ran SE across green flat in hail-rain, all 600 yds. from road & running as llamas reached km. 133. The lone adult lay prone 100 yds. NW of road when storm started. 12:50, the 6 lay prone on far edge green ^(2 prone there.) flat, but 12 continued onto rolling barren low hills for 200 yds. 2 men & about 20 laden llamas. The lone adult remained prone as group passed. Rain stopped 12:53. At 1:00, 3 of 6 rose. The 12 were over barren hill, 1/2 mile from road, & showed no signs of returning. 1:05, the lone adult rose, walked to fence pile & urinated - a fully adult ♂ - then grazed nearby. The 6 grazed at far edge of green flat. The 12 about 200 yds. beyond, on barren low rail hills, at 1:15. ^{I walked} ~~little~~ toward lone ad. ♂ & it allowed approach



Vicugna

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Huaylarq 15000; Dpto. Arequipa

to 75 yds., then walked away, & when pursued squealed in whistling la-sol-la-sol warble. Over low ridge 150 yds. NW of km. 133, on 300 yd. wide flat near a stream, the expected large group containing a small juv. ("tiny"), but only 15 in this bunch now. There about 400 yds. from road, where 17 first seen a few days ago, & 6 about 200 yds S. of them. Overcast, windy. The lone ^{fully} one ran from me & grazed 200 yds. NW km. 133½. Taster bulged. Drove back to 137. The llama train had stopped near km. 134. Below ^{corral} road SE of km. 136, 17, & 2 A1Y in near stream below them.

January 17, 1952. About 7:15, 2 A1Y 100' SE road at 137. 2. 5 100 yds. E. road at 139. 12:30, 4 ad. 50 yds. NW road km. 138. 4 (A). Only 3 on flat in E. 138. 2 Draw (B).
2:30
~~3:50~~, usual 4 on SE side stream at km. 137 - same at 4 p.m.

January 18, 1952. 10:20 a.m., about 50 near mouth E. 138. 2 Draw & 4 farther up Draw (B). I returned 11 a.m. 60 apparent ♂♂ spread 200 yds. near junction Stream & E. 138. 2 Draw. 4 in W. 138. 1 Draw, & 4 100 yds. farther up that draw. 11 100 yds. NW of km. 138. at 10:20, ³ fights going on among the big bunch ♂♂. Two neck-wrestling, constantly screeching. One mounted another from rear, then put forefoot upon rump of other. One chased another & tangled head & neck in its hind legs, head kicking back with both feet when pursued. 11:07, 7 ♂♂ at once run into stream, standing in it, tails up & hind legs spread. One ♂, apparently of B, gently herds group NE across tributary near stream junction. B ♂ retired up draw & grazed 50 yds. SW of its 3 ♀♀ (2 of these lying down 11:15). One of B is a juv. One ♀ appears pregnant, chest curving into abdomen without

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angle at tip sternum. 11:20, 14 crossing stream at confluence (head) of 138.2 Draw. B♂ goes to 50 yds. from, then retires. For 3 minutes most of 14 in swift clear 10' wide stream, bathing from time to time. They lie prone in water, then dip neck til water over lowest dorsal part, then rise, shake. Body given 5 rapid sidewise shakes in about 1 sec. Head & neck often shaken before body. Most stay prone only 3 sec. but one for 15 sec. & then up only when bumped. Seen weakly out during bathing. 11:28, all 14 working SE up draw. The 4 (B) walked to 50 yds. from 14. B♂ nosed feces pile & gave wolf howl, shaking head rapidly side to side, putting muzzle high & vertical with teeth bared. Then B♂ ran at less pregnant ad. ♀ & chased it, & group, 50 yds. along sidehill. 12:30, the 60 or at stream at foot E. 138.4 Draw, some on each side water. 11 at 10:20 & 11 a.m., 14 50 yds. SE of stream ^{in E. 137.5} at ~~foot~~ 3 Draw. 11:45, watched the 60, spread 150 yds., 1 prone (light snowy rain). About 9 juv. in the 60. A ♂ from E. 138.4 Draw herded 60 100 yds. SE on ^{SE} side stream, then ran up the draw, stopping briefly at pile on way, apparently to its group. Rain coming at 60° from NE, but none of 60 prone. At least 2 of B prone. One mild quiet fight between 2 of 60. Now between stream & E. 138.2 Draw tributary (11:55). 11:59, B♂ stood 50 yds. from ♀♀ toward the 60, another 100 yds. away, & 2 min later ran at those (2/3) on SE side tributary & drove them 100 yds. downstream. By 12:08, B♂ back with its group, the 60 at stream-tributary junction. A lone adult prone 100' SE of km. 138.2. Rain continued (12:12). 12:17, only 2 of 60 prone in spite of heavy rain with some light hail. 12:23, B♂ went 100 yds.

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up SW Branch of draw & stood, then leaped across hill to part of 60 100 yds. S. of mouth tributary. Some ran at 50' + or chased one 20 yds., tail up, then ran 50 yds. back up slope & seemed to look at 5 at head of SW Branch. 12:28, B♂ returning to its group, ran 100 yds. up SW Branch. Rain let up. The lone ♂ up 12:30; it seemed barely able to walk as if weak, & moved head slowly when it raised or lowered it. It lay prone again 12:43. The 60 grazed near stream & burn. 1:38.15. The 4 of B went 100 yds. roadward from SW Branch, & B♂ 100 yds. more toward the 60 (200 yds. beyond) (1 p.m.). & it once stood urinating in stream. 1:05, several of 60 came up behind sick prone one, approaching cautiously, ears up, heads about back level & necks outstretched, then at about 10' they would retire. One young one almost touched tail of prone one with nose, & prone adult gave slight motion as if to rise & youngster backed away quickly. 1:08, B♂ made slight attack on the 60 near mouth tributary, 200 yds. from its group, then walked back toward group. 1:17, the lone sick one, a thin ♂, up & faltering walked slowly toward road. Grazed. Drank at pool. 9 of 60 lying on grass near stream. 2 in mild fight with necks. 1:22, sick ♂ got across road. Right foreleg seems unable to bear weight, 20 yds. up slope it lay prone. Almost fell sideways when went down on wrists. 1:30, 18 of 60 lying on grass, mostly on side, some rolling; sunshiny. One mild fight going on. 22 lying down 1:36. 1:41, only 2 still down & sun behind cloud, the 60 on roadside of stream & moving upstream. The E. 138.4 Draw group, 4 ad., was 200 yds. SE of stream. By 2 p.m., 60 between stream & road at 166.2. The ♀, led by ♂, in E. 138.4 Draw, 100 yds. from stream.

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The sick ♂ was lying 100 yds. NW km. 138.2. I walked toward it & at 50 yds. it ran & walked away. About 600 yds. from road up W. ^{138.1} 138.2 Draw, a group of 6, one of which squealed at me at 1/4 mile. All but 23 of the 50 went SW across slopes SE of stream, perhaps urged by B ♂. When I walked up slope NW km. 138.2, the 4 in E. 138.4 Draw walked away up Draw ^{for} ~~until~~ 1/4 mile. all this by 2:20. // 2:25, km. 138.6, 5 (2 juv.), 80 yds. NW road, ^{at least} one ad. a ♂. 2:40, one juv. d. + w. - definite ♂. Nail fell - ad. ♂ down in 1/2 min. Nail light & brief. A sixth, ad., 50 yds. up slope from others, & another 50 yds. farther - all ♂ or ♂? The 5 huddled together & moved SW along slope when 6th ran toward them (♀ + ♂ ads. resident here?) (3 p.m.). On slope across stream from 138.9, 2 ad. as usual. In E. 139 Draw, 10 (1 juv.), 200 yds. from road - probably augmentation of former 8. 5 (0 juv.) near road near Broken Bridge Draw (the diminished 8). 3:15 3:23, ♂ of the 5 came 300 yds. from its band to chase the 10, then fled 50 yds. before ♂ of 10, landing with a jump on feces pile. Then 5 ♂ hiked up hind legs & ran at 10 ♂, then 10 ♂ chased 5 ♂ 50 yds. toward its own band. 5 ♂ then d. + w. on pile & started back for own group. Position of 10 changed by not over 10 yards by this attack. // I drove down road. 3:35, the 2A and 3A 2K 200 yds. apart on opposite side W. 138.6 Draw. 22 ♂ or ♂ in band SE of stream at 138.3, & the 3A 1K 150 yds. up E. 138.2 Draw from them. Overcast & thundering. 3:43, km. 137.55, 10 (4 juv.) 60 yds. NW of road; 3 more (1 juv.; 137.3 group?) ^{137.5} ~~another (ad.; ♂ or ♀?)~~ 100 yds. SE of road. At least 9 in E. 137.5 Draw where it seen a few days ago. The 9 include 2 small juv. 30 ± ♂ or ♂ in band atop slope 300 yds. SE km. 137.7. 3:55, ♂ of

Vicugna

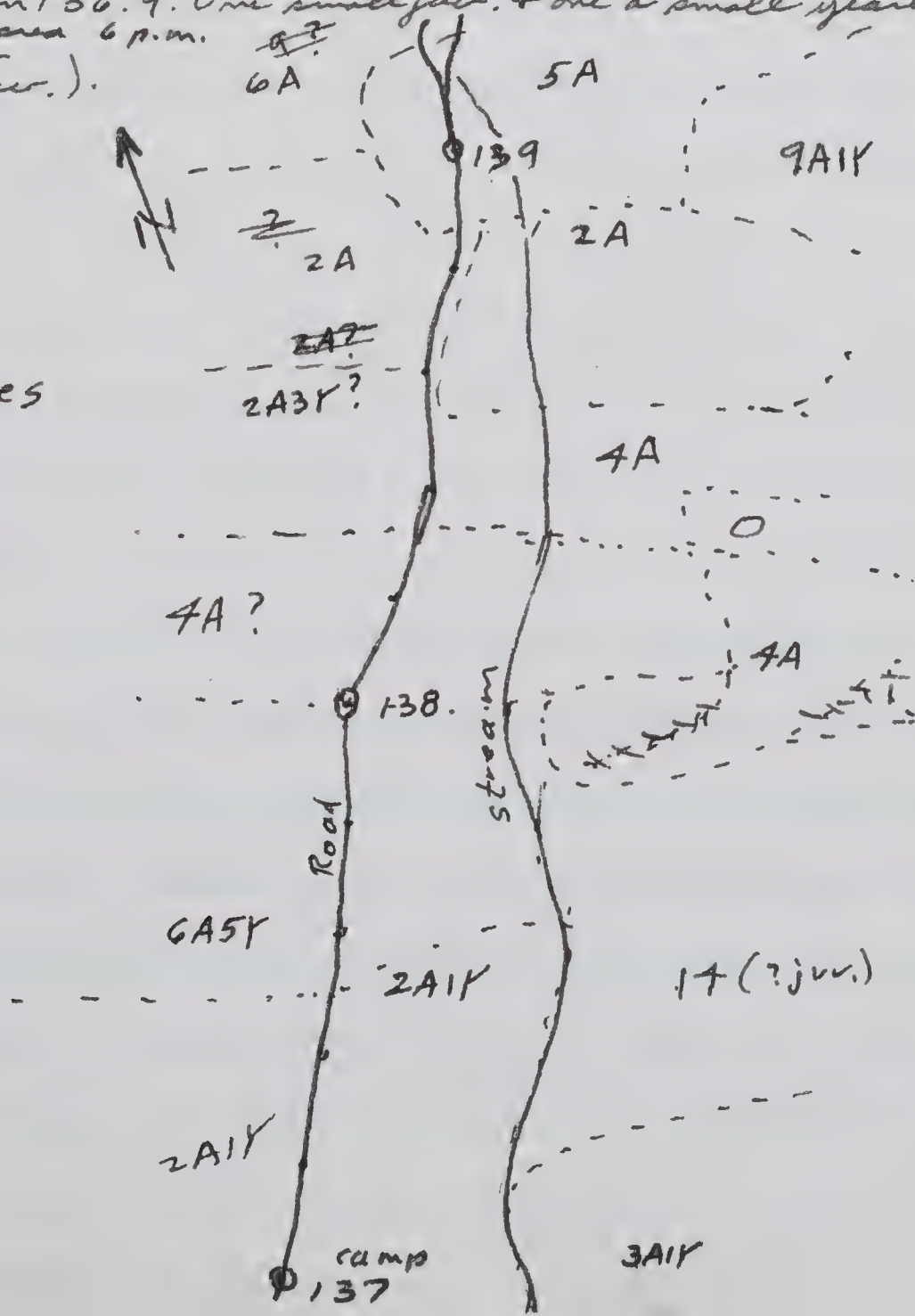
January 18, 1952.

Huaylarco 15000', Dpto. Arequipa

2 A1Y walked to road + 50 yds. beyond + chased the 10, which fled 100 yds. up + across slope. Then another ad. ♂ from SE side stream, ran to bunch + chased off the 3 ♂, then ran 100' up slope at another 3 intruders (♂ of 11). 3 ♂ retired 100 yds. + d. + u. on pile. 4 p.m., the 11 (5 juv.) grazed on slope 100 yds. NW km. 137.6. The ♀ + juv. of 3 100' SE of 137.45, ♂ of this 3 grazing 100 yds. NW 137.5. 4:03, ♀ + juv. crossed road + ascended toward their ♂. This ♂ went to ridge top 100 yds. NW road + chased a group of 4 (same as ♂ of 11 chased earlier). Evidently the 11 + 3 have adjoining territories, 4. line NW of 137.5. 4:10, the usual 4 across stream from 136.9. One small juv. + one a small yearling (possibly these same area 6 p.m. ~~♂?~~ orphaned juv.).

Territories

137-139



Vicugna

January 19, 1952

Huaylarco, 5000', Opto. Arequipa, PERU

6:20-6:30 a.m., drove up road from km. 137. 3" snow on ground & very light snow falling. NW of road at km. 138.6, group of 4 & 2, 200 yds. apart (5 & 2 of yesterday?), all but 1 still prone. Two prone with necks & chins on ground - sleep thus? The 2 AIT were grazing on slope 100 yds. NW km. 137.1. Km. 139.2, 6 (only 1 up, ^(others facing same direction)) at head of a draw, 200 yds. from road (the former 9?). Near km. 140, a group of 30 ± 0707, about half prone. Lightly snowed until 9, fog lifting about 9:30. 10 a.m., returning down road, saw group 5 & 10 in E. 139 Draw as yesterday. The 4 (of 3) on territory 100 yds. S. of mouth E. 138.2 Draw tributary. 100 yds. NW of km. 138, the usual 11. 13 at mouth E. 137.5 Draw, ^{SE} side of stream. 2 AIT, as usual, 50 yds. SE 137.3.

January 20, 1952. 6:15 a.m., 2 AIT 100 yds. up slope NW of km. 137.2. 10 a.m., km. 133 - group 5 & 12 on green flat to S. Km. 133 1/2, 10 200 yds. NW road. Overcast, calm. 4 p.m., 5 150 yds. SE km. 133 in rain, grazing. One prone adult 100 yds. NW km. 133.2. 8 (0707?) 50 yds. NW road at km. 136.8.

January 21, 1952. 8 a.m., 13 up & beyond E. 137.5 Draw, 600 yds. from stream. 8 (0707 of yesterday?) on slope 100 yds. NW km. ^{137.5} 138. Usual 11 in stream bed 50 yds. above km. 137.65 bridge. 4 in E. 138.2 Draw at foot SW Branch. One on ridge 100 yds. NW km. 138.15. 138.8, 2 A as usual on green mat slope across stream. 50 yds. E. of broken bridge, 4 A, & 3 A (one the 07 of the 4?) 50 yds. NW km. 139.05. Usual 10 in E. 139 Draw, 200 yds. from stream. 2 of 4 prone (8:30 a.m.). Sky 7/10 alto-cumulus & cumulus; calm. 8:35, 3 of 4 down, 2 on side & 1 prone; weak seen-

Vicugna

January 21, 1952

Huaylarig 15000', Depto. Arequipa

shine (lie on side only in sun?). 8:38, of the 3, one crossed to SE side road at 139.1 (or returning to 4?), the other 2 (one d. & u., a ♀ ad.) stay together. 8:41, all but 1 of 4 up. The ♂ went 50 yds. closer to the 4. 8:50, one of the 2 a ♂ with tip 1" of left ear missing in a straight line. 8:54, 2 of 4 now down. 8:58, only 1 of 4 down; the ♂ still 100 yds. from them & across stream. 9 a.m., this ♂ crossed stream 80 yds. S. of the 4, d. & u. on a pile, quickly walked 50 yds. toward the 10, tail up. The closest 4 of 10, 100 yds. from the ♂, ran 20 yds. away, ♂ stopped, then gave 3 chirps, descending in pitch, & ran 50 yds. closer to the 4 (150 yds. from 4). 9:08, 9 (2 juv.) came over pass at head W. 139. Draw, 200 yds. from road. Some rolled. Then walked S., apparent or leading. The 2 noticed but made no approach. 1 of 4 still prone. 9:12, 3, 2 youngish & 1 juv., appeared at mouth E. 139 Draw tributary. 5 ♂ stood 50 yds. N. of them. Suddenly one of 3 ran N. close by ♂ & ♂ chased it, other 2 of 3 following, & all passed 50' from the 4, & chase ceased, the 3 (all up) walking on normally 50 yds. N. of the 4 (now 5 together). The 5 100' E. of Broken Bridge. 9:17, the 3 went up B.B. Draw, or of 5 watching. 9:23, or of 2 layed 50' uphill & d. & u. on pile. The 2 still SE of 138.9 on green slope. ♂ walked S. along slope; ♀ d. & u. on same pile & followed 50 yds. behind, ascending slope NW of km. 138.8 (these the 2 seen NW of km. 138.7 Jan. 18 & 19?). 9:30, 5 ♂ again off toward 10, returning to group at 9:36. (100 yds. from) W. of km. 139.3, a group of 5 A incl. 1 ♂ + ♀♀; ♂ may be too at 139.5 chasing group 15 or 4. Probably this 5 or 6 is remnant of former 9A here. 9:38, 1 of them 5 prone on slope; 3 prone 9:40. 9:45, ♂ of ^{Broken} Bridge 5 ran N. as if to chase some in B.B. Draw, out of my sight. 9:58, a 4th of W. 139.3 5 was prone. 9:51, I moved to 139.2. The ♂ of E. 5 was on rocky hill

Vicugna

January 21, 1952.

Haylarco 15000; Dpto. Arquipa

E. of 139.3, where a group of 40[±] ♂♂ being driven N. Over hill to N. by 9:56. The ^{4♀♀} ~~4♂♂~~ wandered to near mouth of E. 139 Draw tributary. 9:58, an ad. stood on atop a crag 50 yds. up slope E. of 139.3, looking W. at 5 across canyon (or of there?), then descended to near road & grazed. Occasionally it rolled on sloped ventrum down hill. 10:08, it crossed to below road opposite the W. 5. This evidently ♂ of that group, the ♂ of the E. 139 group of 5 coming S. ^{over} rocky hilltop (E. of 139.3) at 10:12 & descending toward its ♀♀; joined them & chase 2, 1 at a time, a few steps. ^{10:20-} 10:27, 3 of 5 bathed in clear 6' wide running stream. First one; slowly prone in water, soused neck, rose & shook. Kicked back with 1 foot at second approaching from rear; later blew at it. Cars back & drawn somewhat together & depressed below horizontal when in spitting mood. Then another bathed, all 3 within 10'. One stayed prone in 8"-10" water 10 sec. & soused neck 5[±] x, clear to base of head. Sometimes head or body shaken when in water. As many as 5 separate prone-sittings by individuals. Two ran fast or left water. 10:30, all 4 ♀♀ in the pool 2 minutes; more sousing. One only down to wrists, dipped curve of neck, rose; then fully prone. 3 of 4 ran out & 10 yds. away, then other joined. One ♀ d & u., urine pulsing out at rate 5/2 sec. ♂ walking toward initiated movement. All ♀♀ went 50 yds. down stream, across road at 138.95, up W. 139 Draw, ♂ behind 10-50 yds. & all running at times (10:35). A tall up ad. ♂ approached the 5 from S., stop hill, stopping at top W. 139 Draw as 5 went on to NW. out of NE, right of road. The ♂ joined by ad. ♀, 100 yds. W. of 139. 10:40, the 2 on green slope E. of 138.8, still. 10:45, km. 138, the sick ad. ♂ 100 yds. to NW, walking fairly well. 11:05, the 11 100 yds. up tributary

Vicugna

January 2, 1952

Huaylaray 15000'; Depto. Arequipa

from bridge at 137.65, 4 an ad. ♀ + 2 juv. bathed in swiftly running stream. 9/10 sunnier but bright. One stood in water halfway to wrists + grazed at grass on bank. Another bathed. Pregnant ad. ♀ d. + u. ¹⁰ all near the creek ascended 50' hill, going NE, to an adult (♂?) then, + all grazed in close group (11:15). ^{1:30-1:50} ~~11:30-11:50~~ drove 137-139. The 11 100 yds. NW km. 138. The 2 50 yds. NW km. 139. The 6 100 yds. W. stream at km. 139.3. ♂ of 6 went 200 yds. to W. uphill toward 2, stopped to d + u. on pile, then on after the 2. The 2 had moved off when ♂ 50 yds. from them. Group of 5 at top of Broken Bridge Draw. Drove down road. Rain + hail. 1:12, 7 atop ridge across stream from km. 136. 1:20, 5 (10?), 100 yds. beyond stream opposite 135.6, all adults. A group llamas grazing nr. km. 135. The group worked NE along sidehill, grazing between clumps spring Festuca. 1:33, they started at a group of 20+ which crossed from NW side of road near km. 136. 1:40, 1 of 5 def. + ur. on pile; ad. ♀. ♂ grazed 50' down slope from others. No reaction when 2 men + 30+ llamas went up road, 300 yds. from them. ♂ of 5 started to SW, moved 100' that way, started. Then (1:50) a lone ad. ♂ seen 150 yds. from it. This one ran then to NE + across stream, the 5 ♂ following, tail up, on opposite bank. Then 17+ ♂ from NE ran toward the lone ♂. This stood, tail down, 4 of 17 stood, tail up, 30' from it. The lone one joined the big group. 5 ♂ crossed stream slowly toward the 18, then, tail up vertically, chased them. The ♂ moved back upstream, the 5 ♂ standing 100 yds. SE 135.8, watching. Then 5 ♂ ran another 50 yds. at the retreating group, + they moved off faster. The other 4 of 5 remained grazing on slope thru all this. 2:02, the 5 ♂ standing with the 18 ♂ cross stream to SE side 50 yds. beyond km. ♂ then crossed

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January 21, 1952

Hwy 100, 15000; Dato. Arroyo, 1100

+ drove group upstream. This 5 in area near our former camp. By 2:20, 5 or 80 yds. NE of the 4 ♀♀, & they worked toward him along sidehill. 2:25, the 18 ran closer, to 250 yds. from 5, & 5 or immediately ran toward them. They ran when he 50 yds. away, & he stopped, tail up, & stood facing away from them. A min. later 5 or again toward the group & they away to about opposite 136.1, & 5 or to about opposite 136. 2:33, or returning toward the ♀♀. Windy, all overcast, thundering. 2 llamas train passed going NE. I drove to km. 133 but several groups gone. One ad. 100 yds. NW road at km. 133½. On ^{barren} ridge ¼ mile NW km. 134, 7 running. 3:20, the 5 or is on slope to SE of 135.6. 3:33, km. 135.9, a family group of 7, 1 or 2 juvs., crossed from NW side road to stream & across it, and onto side slope, 400 yds. from the 5. On up to top & over top of slope. 3:50, 16 or below coral opposite km. 136. 4:05, 2 joined group so all 18. 4:07, hail commenced & all quickly down prone facing away from direction of hail. When hail harder, all moved forward & a compact bunch was formed, many apparently ^{hail.} butting sides. Ground white with

January 22, 1952. 7:25 a.m., 6 50 yds. NW km. 136.55, 2 or + juv., perhaps all or. Across stream one, 200 yds. NE of stone coral. Km. 134.4, 9 100 yds. to NW with 1 small juv.; evidently resident group seen before. 133.3, ad. on SE side road & a juv. 80 yds. NW road, some running (ad. chasing juv.?) as I approached. On green flat ¼ mile S. of km. 133, 3, ^(or) 3, grazing, another walking to road at 133.1. This last crossed road & on to 200 yds. NW km. 133.3. 7:55, a group of 11 came parallel to road from km. ^{132.8} 133.2. The lone adult near ^{road at} 133.3 started for them, the lone juv. following, & 1 of the 3 from green flat ran to them. The 11 ran eastward

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Huaylarco 15000' Dpto. Arequipa

parallel to road, these 2 A and juv. mixed in. The other ad., 200 yds. NW 133.3, did not immediately run to group but followed. Chase continued to opposite 134+ beyond, the 11 apparently running into the 9. By 8:05, none of these had returned to km. 133 1/2 area. Probably the 11 a group of ♂♂, & these may be chased far beyond territorial boundaries. Llama trains came up road, & I walked about area in mapping. 10:30, lone adult near road at 133.4. On Green Flat, group of at least 11 (12?). at about 8:30, saw 13 over low ridge, 1/4 mile N. km. 133, near stream (the former 17 probably). 11:30, lone one 1/4 mile S. of 133.6. 12 M., group of 10 (1 juv.) 200 yds. N. of 134.4. 12:40, steep hill SE of 136.6, 4, probably camp group. 2:30, the camp group across stream opposite 136.4. at 3:05, there going up draw opposite 137. All overcast, cumulo-nimbus. 3:10, km. 137.6, the 11 (5 juv.) 50 yds. NW of road. ♂ crossed toward stream, & by 3:15 all had crossed road, following. 3:20, km. 138.2, an ad. ♂ crossed NW-SE & stood near stream. A group of 20 ♂♂ (8 or 9 juv.) on opposite side stream. A vigorous chase between 2 went up E. 138.4 Draw (♂ of a family band chasing?). On flat of head E. 138.2 Draw, 4, one 60 yds. downstream from others. at least 2 juv., not smallest, with white tipped ears. Two juv. with lips constantly agape after a fight. 3:40, lone ♂ still 50 yds. SE road at km. 138.3. ♂ of 4 ran after 9 on SE side SW branch of draw & chased them to W. 300+ yds., then d. & u. on side 100 yds. from its group. 3:45, foot E. 139 Draw, 5 (0 juv.); same 4 p.m. 4:05, 2 A at head E. 138.65 Draw. 4:10, km. 138.3, 37 ♂♂ at stream. The 4 of group B 100 yds. S. of mouth E. 138.2 Draw, ♂ 50 yds. nearer than 9, & watching 37. a ♂ ad. 100' N. of bunch

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nosed pile, shook head, & gave wolf howl, then ran into bunch. Sprinting.
 The 4 went downstream along hillside to SE of 138 or below. The
 bunch moved to south E. 138.4 & ran. One (of a family group
 probably; the wolf howler?) went across road & NW at 138.2, 4:33,
 a ♂ in E. 138.4 & ran drove 4 of the 37 off to NE, then herded
 the 38 across stream. icy rain falling. The stream may be
 territorial boundary as at 4:40 the ♂ ran up draw towards its grave,
 200 yds. from stream, & stopped at fence pile halfway there. 4:45,
 km. 137.6, the 4 formerly chased by B ♂, now across stream
 on slope, a ♂ pursuing. Group B (3 of them) came in storm
 300 yds. SE of 137.9. Most of the 11 came 100 yds. ^N 137.6.

January 23, 1952. 6:45 a.m., 2 juv. grayling 50 yds. SE of 137.5. 7 a.m.,
7 (2 juv.) 300 yds. NW km. 137.9, on ridge. 11 on high ridge 400 yds.
NW of km. 137.8, several lying on slope in sun. One ad. 50 yds. NW
of km. 138.3, & it retired into W. 138.1 Draw when I stopped nearby.
I climbed hill & saw then 2 ad. in the Draw, ³⁰⁰~~250~~ yds. NW of
km. 138. Both approached at me at 200 yds., & one came 50 yds.
closer & put forefoot on low boulder. The 7 seen earlier walked
N up a ridge 500 yds. NW of 138, & a group of 5 was on same
ridge 500 yds. NW km. 138.5. The 5 + 2 may be same as
seen to NW of km. 138.6 in past days. 7:29, km. 138.8, a
group of 12 (2 sure juv.), apparently all ♂♂. Then went
to W. 139 Draw & grayed. Two adults came down slope ^{W.} of
138.9 & crossed over road & stream to green slopes opposite
138.8, but they continued walking toward E. 138.4 Draw. 9 in
E. 139 Draw, 250 yds. from stream (10?) (7:30 a.m.). of the 12, 8
lying on slope in sunshine. $\frac{4}{10}$ rems; unusually sunny &

Virginia

January 23, 1952

Huaylarco 15000', Dpto. Arequipa

no breeze yet. 7:40, at Broken Bridge, 6 ad. near W. side stream at 139.25, 4 ad ♂ chasing 10[±] ♂♂ in W. 139.3 Draw. at least 3 on ^{rocky} hilltop E. of 139.3. 8:05, ♂ of 7 ran, head low, toward me on road at 139.4 & stopped 50' short of it, then turned & looked downstream. 4 then 7 ♂ ran too to 139.3, toward me approaching. One came upstream to 50 yds. from ♀♀ of 7. The 7 ♂ did not fight the 2 singles or come closer than 10 yds. to them but allowed them to graze 50 yds. from ♀♀ & soon itself grazed. ² Newcomers ♀♀. 8:10, ♂ of 7 gave warbling descending whistle, nostrils dilating with sound & abdomen constricting but lips immobile. The warble evidently at a which appears atop rocky hill E. of 139.3. all ♀♀ faced that way attentively. Alarm subsided in 2 min. 8:15, 8 ♀♀ grazing peacefully within 30' diameter. ♂ off toward 12 ♂♂ which appeared 100 yds. W. of 139.2 & herded them uphill & away from road, then stood atop 3' high boulder, tail up, & watched them. A very low grunt like indistinct talking heard as one ♀ blew at another. 8:25, ♂ ran to meet an adult ♀ at 139.1, & as a car came along both ran across road, the new ♀ leading & joining group, so 9 ad. ♀♀. 8:28, a black dog ran up stream & into E. 139 Draw. ♂ of the 10 gave a warbling whistle & group faced dog area, then all retired 50' up slope. The 12 ♂♂ went N. 200 yds. W. of stream at 139.3, not seen by the 10. The 10 went uphill near head W. 139 Draw. || 9:10, km. 138.3, 20 ♂♂ at stream & 2 urinating in it. Head 4 50 yds. SW of tributary 200 yds. above mouth. ♂ of 4 to north tributary & 10[±] ♂♂ there walked over to road side of stream, then the 4 ♂ walked back to its group. The group of 10 ♂ ascended slope & crossed road. ||

January 24, 1952. The usual 4 (♂, 4, ♀A, yrling, juv. ♀) desc-

V. c. v. g. n. o.

January 29, 1952

Huaylarco, 15000', Dpto. Arequipa

ended S. fork of E. 137 Draw at 7:20 a.m. & grazed; 2 d. & w. The yearling (nearly 2 yrs. old) definitely smaller & shorter-headed than adults.

7:30, 6A54 at side stream at km. 137.9. On E. 138 Flat, 300 yds. E. of km. 138, a group of 14 ♂♂ (only 2 or 3 fully adult) being chased by a single ad. ♂ (of the ["]group B), & herded to near mouth E. 138.2 Draw tributary.

7:40, the usual single ad. just below road at 138.2. This one ^{perhaps} apparently remnant of former 6 & 4 in this territory. No sign illness. It ran to near stream as group ♂♂ approached. The B ♂ stood at edge of flat, stop slope, after group of ♂♂ descended. Territorial boundaries may be edges of choice grazing areas rather than physiographic boundaries (streams, ridges, roads). The 11 ♂ walked back along top of slope to ^{stream} where several of its band had ascended, & all 11 together again, grazing at road edge of E. 138 Flat. 2 or 3, prob. of the 4 of B, at ^{NE} SE corner of this flat. In E. 137.5 Draw, a group of 14, 200 yds. from stream. On SE bank of stream, at least 4, opposite 137.7. 8 a.m., the lone ♂ still at mouth E. 138.2 Draw creek but had not crossed stream. The 14 were across stream from it. An ad. ♂ + 2 smaller came down slope & across road at 138.3, big ♂ in rear. The lone ♂ ran 100' toward them & stopped by a fence pile. The 2 younger ran by big ♂ & it made feeble attempt to intercept them. Then the ^{ad.} ♂ came by, tail up, & ran across to the 4, as if belligerently. Then 3 (2 juv.) more came down across road at 138.3 & to stream, running. Lone ♂ ran to fence pile & stood, tail up, then 50 yds. toward the new 3 & stopped. All the ♂♂ ^{across} stream from the lone ad. ♂, the newcomers evidently mixed in the bunch. Then all started running as 2 black dogs came running from head of E. 138.2 Draw. About 6 from farther up the draw joined the bunch ♂♂ & all ran & crossed stream opposite 137.9, then on up &

VicugnaJanuary ²⁴~~23~~ 1952

Hay/avg 15000; Opto. Araguipa

down slopes & ^{nearly} straight up a ⁴⁰30% slope NW of 137.7 & over the top, 1/4 mile from road. One dog on slope or 50' behind. About 26 in first running group (includes lone ♂?). This all about 8:10. Then I saw 11 (the usual 11?) on slope 200 yds. E. of 137.6. 8:20, a group of 5 (1 juv.) came running from E. 138 Flat to mouth E. 138.4 Draw & on parallel to road (¹⁰⁰⁻200 yds. from) to opposite 138.6 or farther. 8:35, 5 atop ridge 300 yds. E. 139.1. // 12:10, drove to km. 133 (12:30), looked down N. 133 Canyon, returned to 138 (1 p.m.), without seeing a vicuña. Dogs, plus occasional man on road, cleared them out. 1:05 p.m., the usual 3A1K in E. 138.2 Draw on flat near head. 138.7, a group of 8 (1 juv.) ascended from stream to slope to E, & walked N. along ridge. Juv. trailing, the 8 to E. 139 Draw. 1:15, 2 ad. at head W. 139 Draw, ♂ the one with tip L. ear gone. The 8 grazed 150 yds. E. of stream, 50 yds. S. of tributary. These may be the 10, returning from being chased by dogs. 1:20, the ♂ descended to bottom draw, 200 yds. up tributary. By 2 p.m., all had crossed tributary & were in most usual area of the 10. ♂ 50 yds. N. of others. Evidently the 10 returned to 8 again by late 2 ad. ♀♀. By 2:20, no change. Grazing in bottom shallow draw where bunch grass (same as at stream bed) grew on 5% slope with Dactyloctenium nat.

January 25, 1952. 1/2" new snow. 6:50 a.m., 9 or + (the 11 probably)

250 yds. up tributary from 137.6 bridge. 2 100 yds. NW of km. 138. Across stream from 138.7, 20 (prob. ♂ or ♀). 5 at Broken Bridge, 8 in head E. 139 Draw. 5 100 yds. W. of 139.3 (7:10 a.m.). 8:49 km. 140, 18 ♂ or ♀ (4 same juv.), one ad with leg broken just above hock, & dangling & swinging as walked but not causing obvious pain & animal not wasted, grazing with others. Wounded ♂ or ♀ are in the young ♂ or ♀ groups; perhaps also oldest ♂ or ♀. 8:45, the

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Huaylarco 15000', Depto. Arequipa

5 still at foot W. ^{139.3} Draw. other light line (nest?) on side, apella to grain (noted when 10 in bunches a few days ago). At 7:10 a.m., the usual 2 at road at km. 139. Now, 8:45, ¹⁰ 4 adults at 139.2, the 5 having just entirely crossed road & some encounter with the 2, & others present. ♂ of W. 139.3 group went 50 yds. S. to opposite 139.25, & its ♀♀ soon followed. Alts - stratus overcast; bright. ♂ of the 10, 5 100' from road, ♂ occasionally staring, tail up, at 2 50' to S., one ^{at} W. side road, & 2 on opposite side. At 9:05, the W. 139.3 group had moved to 50 yds. from the ^{E. 139} 5, & retreated 50' as ♂ of the E. 139 group came 50' towards them. This ♂ then grazed 50' from the W. 139.3 group, its own group 70' to S. 9:07, one [♀] of ^{W.} E. 139.3 group ^{up 9:21.} prone. The 3 at road at 139.1 appear to be ♀♀ & pregnant; perhaps joining E. 139 group. Group of 2, 5, & 5 at about same height on slope within space of 150 yds. 9:12, of the 2, ♂ with missing L. cartilage d. & u., then walked to roadside at 139, & by 9:15 ♀ followed halfway. 9:20, the E. 139 group 50 yds. up the slope from the other 5. ♂ of upper 5 ran to lower group & chased a ♀, trying to trip its hind legs with head, but ♂ of lower (W. 139.3) group quickly intercepted & drove off other ♂. The 2 ♂♂ stood 8' apart for 1 min., giving deep grating seal-like growls every few seconds & occasionally seeming to spit. Then about 10 ♂ came down over hill above upper group & about 30 came up NW side of road all at once. ♂ of upper group chased 2 thru lower group, & soon both ♂♂ began chasing. ♂ of the W. 139.3 group never over 50 yds. from its ♀♀ but other ♂ chased as far as road at 139. At first encounter between the 2 ♂♂ the 3 ♀♀ by road had ascended to upper group. The 7 ♀♀ stood, ears back, quietly, during the chasing, tho at

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times $5 \pm$ $\sigma\sigma$ within 20' of them while their σ away. The
 2 near 139 lost in the shuffle. The σ band had appeared at
 9:25 & was driven off by 9:35, about 32 being then on SE side road
 at 139, & 10 over hill N. of 139.2. 9:37, σ of E. 139 σ was chas-
 ing $\sigma\sigma$ at road at 139 when σ of other 5 attached its group. The
 far σ returned running uphill & drove other σ off; the 2 groups
 then 50 yds. apart, 1 or 2 $\sigma\sigma$ of each prone (9:50). A truck up road,
 & σ of 2 to 50 yds. W. of 139 where joined by σ . 9:55, σ of 8 ran
 100 yds. down hill & to mouth E. 139 tributary where 32 $\sigma\sigma$, some standing
 in water, & charged, tail up, threw them $4 \pm$ & drove them 100 yds. down-
 stream. The σ occasionally looked back at $\sigma\sigma$, & when 5 σ , followed
 by group, closed with the 7 $\sigma\sigma$, 8 σ ran back uphill & attached
 the 5 σ , driving it 20 yds. away, then driven back toward own $\sigma\sigma$
 but spit out a mouthful of hair. The 2 $\sigma\sigma$ stood 5 yds. apart
 giving low cries, apparently as then other spitting. The boundary be-
 tween 8 & 5 ran uphill W. of 139.2 for 100 yds. Both ~~at hilltop~~ ^{at hilltop}
 at 10 a.m. || Some of 32 had jumped parts of stream, perhaps 8; when
 chased. From the jump forebody high as if to land on hind legs.
 This noted before. When 8 σ ran back up slope, crossed road at
 139 & passed 50 yds. from 2, σ of 2 running to intercept it
 but stopping 5 yds. short & 8 σ ran past. || 30 $\sigma\sigma$ were 150 yds.
 from stream up E. 139 Draw before σ from 8 up that draw ran to them
 & stood just upstream, & group walked downstream slowly. Some
 others of σ group were at main stream. The 2 went S. to next hill.
 8 σ ran to its group on crest hill 300 yds. E. of 139.1, stopped
 & grazed 50 yds. short of them. Still, juv. in group. Of the ^{33 $\sigma\sigma$} ~~33 $\sigma\sigma$~~ at
 least juvs.; perhaps more.
 & perhaps 13 juveniles. 10:37, 8 σ came down slope 200 yds. &

46-353

Red ford - dual wheels

San Roman 51

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Huaylarco, 15000', Depto. Arequipa

stood on mound near 30 ♂♂ which had moved 70 yds. N. of tributary, & all gradually moved to S. side without being chased. Because older juvs. are the ones in ♂ bands & as many 1 year olds there too, it is difficult to accurately count juvs. in ♂ bands. At first pile a 1 year old had prominent testes. One, ^{of ♂ band,} not juv., gave wolf howl. The ♂ followed 33 to 100 yds. downstream from mouth E. 139 tributary. @ 10:50, a dual wheeled truck full of people stopped opposite the ♂ bunch & a man shot at them with rifle, prob. 122. The bunch moved E. then but in no great alarm, & on saw hilltop. The 7 remained grazing on slope, rocky, opposite 139.1. 11 a.m., 8 ♂, which had been following the 30⁺, returned to bottom E. 139 Draw; then ran on toward ♀♀. 11:10, 3 ^{ad. bottom} in E. 138.4 Draw, 150 yds. from stream. 17 went E. along ridge E. of 137.7, on across head SW Branch of E. 138.2 Draw, then down toward bottom of draw. ^{5 (4 arguable?) (1 juv.)} The 4 were at E. end of E. 138 Flat then. Heavy rain commenced. As the 17 crossed head of draw, ♂ of 5 ran 100 yds. toward them, its group following 50 yds. behind. Then ♂ to 100' from tributary & group walked away to ^{NE} on opposite side. 11:20, 5 ♂ crossed creek, ascended slope 50 yds. to the 17, again gave chase a few yards. 11:28, ♂ returned to where it crossed creek. 2 of 5 seem juv., & these, tail up, ran 50' & lashed at ♂ approaching. The 5 then together 50 yds. SE of mouth SW Branch. ^{+2:15 11:50} Then ♂ to top ridge, 50' from group, staring up canyon. Saw 15 ♂♂ came down, probably driven by another ♂, & after they reached head of E. 138.2 Draw, the 5 ♂ chased them up canyon again & returned to its group (11:56). Two only visible in E. 138.4 Draw, (prob. not) one apparently pregnant yearling (almost 2 yrs.). 12:05, usual 11 on slope just across slope to E. of 137.7. 12:10, only 100 yds. from head, 4 (1 juv.). An older juv. (or yearling) has

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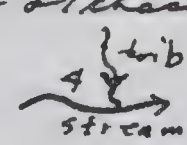

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Huaylarco, 15000; Dpto. Arequipa

left eye shut as if blind from ^{injury} ~~just~~ 7. or across stream from other.
 Mary said a lone one, 100 yds. up stream, had come toward 4 or
 about 12 M. & stopped when 4 or ^{met it} ~~stood~~, tail up; then retired up
 stream again. 1 p.m.; heavy rain. The 4 & 1 all prone within 5
 minutes. Of the 4, or 80 yds. NE of other 3, all on grass in open. The
 lone one adult, probably or. Chewing cud, jaw to ^{same} side every 1 or
 1 1/5 seconds. In prone posit., hocks touching & over tail.  rear view. 1:12,
 hail. The 3 went to or & prone 5-10' from it. The blind juv. about
 same size smaller; perhaps both juv. Cars both horizontally. Occasion-
 ally 1 shook head or flicked one ear up & down. 1:25, still raining. 1:28,
 juv. lay chin on ground, neck in front of body. 1:34, this head up but the
 other 3 put chins on ground in front of them; 2 up by 1:37. 1:43,
 rain ^{almost} stopped, lone one up & grazing. Last head ^{of 4} up, then juv. head down
 again. 1:46, lone one to fence pile; d.t.u.; a ~~or~~ 1:50, rain resumed; all 4
 prone with heads up. 1:52, all but juv. up & grazing. 1:54, juv. up.
 The ad. ♀ appears pregnant. 2:05, light rain. 2:10, the 2 youngest d.t.u.
 in turn on one pile; both ♀. The 4 walked away from stream & on
 over crest of N. branch of E. 137 Draw at 2:15. Lone or grazed as before.

January 26, 1952. 2 "saw on ground 6 a.m. 6:40 a.m., 9 in ^{W?} E. 139.3group at foot ^{W?} E. 139.3 Draw. far usual on flat in E. 138.2 Draw. 10:50.

9 50 yds. E. of 139.5 - ^{139.3} ~~the~~ group? 11 a.m., km. 138.3, 43 or or, at
 least 17, ^{10, prob. 17, perhaps over 20 juvs.!} ~~perhaps 20 juveniles!~~ The 4 (juv.) on SE side stream

at mouth tributary, & or chased or or into stream, apparently regarding
 that as boundary.  Of the 43, only 8 at most appear to
 be over 2 years old, & only 3 sure. Occasionally a juv. or yearling
 noses fence pile & gives wolf howl, muzzle high  & head
 shaking. In defecation, protruded part rectum is bright blood red.

10. 10. 10. 10. 10.

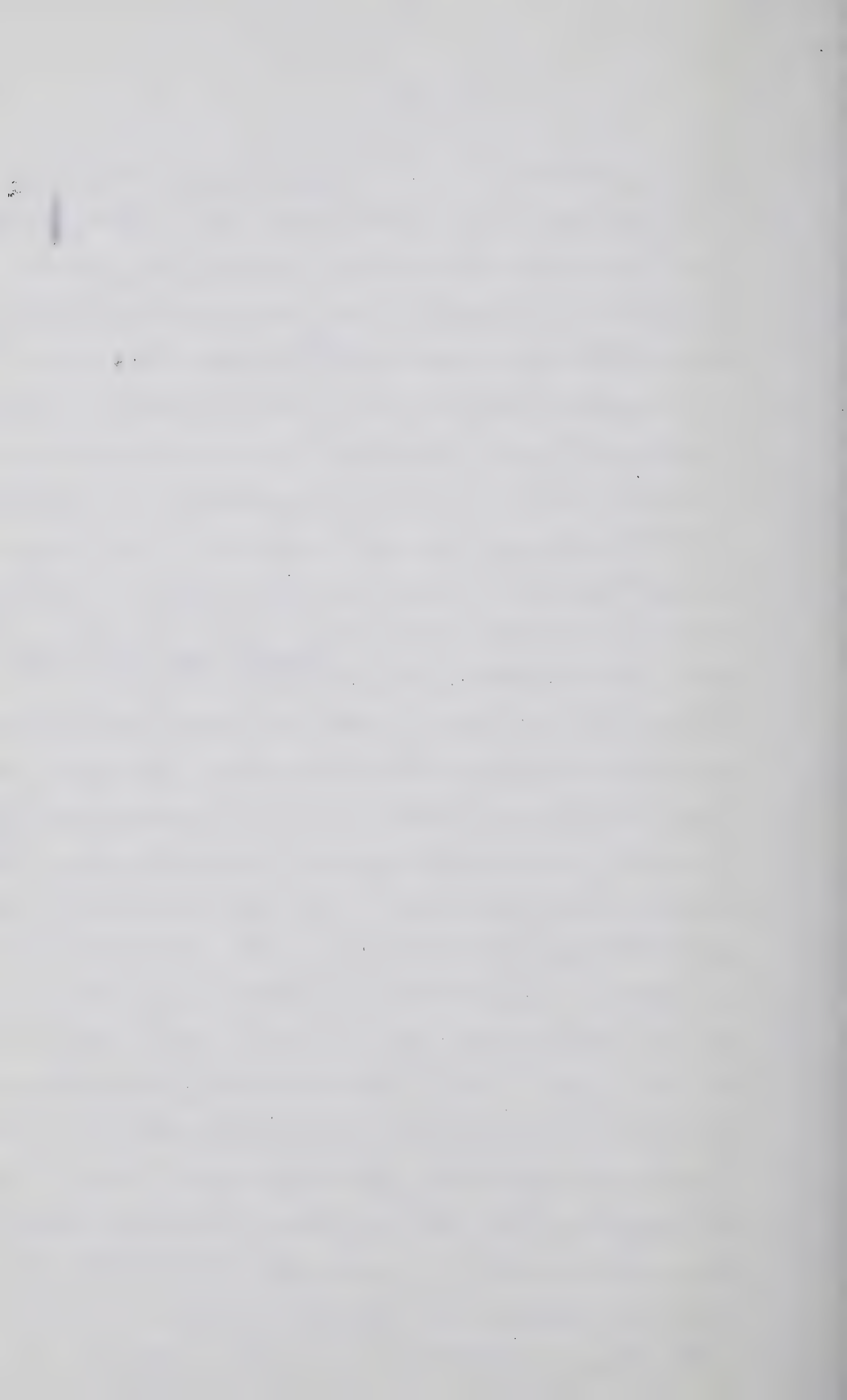
Vicugna

January 26, 1952

Huaylara, 15000', Dpto. Arequipa

The ♀♀ of 4 appear to be adult, yearling, & juv. These at NE side of mouth E. 138.2 Draw by 11:50. Perhaps have taken part of territory of former 6 here. The 43 grazing on slope NW of road at 138.3 at 11:50. Many told me that the 4 were opposite ^{camp} ~~camp~~ at edge stream 9 a.m. & one almost opposite. All disappeared about 9:50 (dog?). 1 p.m., one chased another going SW near ^{137.} 1, across stream opposite 136.9, back up SE side stream to opposite 137.5+, one bawling calf-like again & again, never over 10 yds. apart, near one once trying to put head under hind legs leader. Both not looking. A long chase, at least 1/2 mile continuous running. ^{may noticed 3-4:30 & saw juv} in 11 at km. 138.


to Vinto, Dpto. Arequipa
January 27, 1952. Thin cirrus clouds; calm; frosty. 6:15 a.m., the usual 4 in E. 137 Draw; squeaked at me 200 yds. away. On way to Imata at 8:15, 9 (1 juv.) at km. 135. at green flat S of km. 133, 11 & 5. Saw 3 groups between 132 & 125. 6 at green grass draw SE of km. 126 1/2, & 2 other groups on gravelly pampa. Returning from Imata to camp, 11:15 - 1:15, saw following vicuñas within 250 yds. of road. Imata - 0 miles. 2.9 miles, 5 & 5 (1 small juv.) on flat short grass ^{pampa} ~~and~~ where many alpacas & llamas. Vicuñas within 50 yds. alpaca group. 3.3 mi., 5 & 3. 3.6 mi., 4. 3.8 mi., 3. 4.2 mi., 6. Then over a sandy rounded hill, 6 at streambed at base, 5.1 miles from Imata, of far side. 5.4, 3. ~~6~~ 6.7 miles, tala flat & stream, flat 200 yds. wide. 6.8, 4; 6.9, 5; then on grass & tala flat near stream. 7.2, passed conspicuous finger of rock on right. 7.5, groups of 5, 5, 5, 7, & 4, on 200 yds. wide green flat, sandy schar hills on left. 8.3, 7. 9.0, ^{100 yds. wide} with schar, green flood plain near stream; alpacas. 10.4, sandy area with schar, flat. 11.4, tala with schar, up to 1 ft.



Vicugna

January 27, 1952 Inata to Huaylarco, 15000', Dpto. Arequipa
 high, on sandy flats. 11.8, 3 in wet wash. 12.0, 5. 13.2,
 3. 13.3, end of ciche & tala; sandy pampa with occasional draw
 + vegetation. 13.4, 1. 16.2, 1. 19.3, hit Puno-Arequipa road about
 km. 124½. Km. 125 = 19.6 mi. from Inata. 21.3, 7, all prone, on
 gravelly pampa, 200 yds. from short grass area where often have
 seen some. This at 1 p.m., km. 127.7. 13.8 mi., 1. 15.5 mi. = km.

133. Llama train going east at km. 132 may have disturbed some.

January 28, 1952. 7 a.m., usual 4 at top N. branch E. 137 Draw. One
 east, stratus. 8 a.m. 9 (4 juv.) 50 yds. NW road at 138.9. Ad. + juv.
 (remainder of the 11?) at foot of W. 138.1 Draw. Usual 4 on E. side
 of E. 138 Flat. 8:10 a.m., 5 (2 juv.) in E. 138.6 Draw, 100 yds. from
 road, grazing diligently. One a yearling (nearly 2 ~~yr. old~~). 8:20,
 light snowfall + fair wind from W. The snow melts upon striking
 ground. One juv. prone 8:33, another 8:36 (faced opposite; grazed
 while prone); a third one at 8:40 (ad. ♀). 9 a.m., another prone, one
 (♂?) still grazing. Prone ones 5' to 15' apart. Snowing continuously.
 Some snow sticks on hair of vicuñas - even on ears & is not shaken
 off. 9:08, ♂ walked 100' across slope to feces pile, mated it, def.
 + urin. Urination took (½ minute! - tail pulsed up & down
 at rate 14/5 seconds during urination; held  9:20, 2 came
 down ^{slope} ~~steps~~ to 70 yds. below 5 ♂. Leader a ♂ ad.; to feces pile
 + d. + u., urination taking about 1 minute. No shot ear - not
 same 2 as seen near 139 on occasion. Snow continues, now
 whitening ground + frosting vicuñas. Prone ones occasionally flick
 an ear vigorously. Prone ones chew cud, ^{about} eyes at back level,
 all ~~at~~ ^{at} places where first lay prone (9:27). 9:28, 30 ± llamas + 3
 men came down road. The 2 ad. retreated up slope, 5 ♂ ^{men} ~~retreated~~

Vicugna

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Huaylar cg 15000; Opto. Arquipa

a few yds. towards & stood, tail up, then walked away up slope. The 4, in grass, walked up slope & over top, 200 yds. from road. I moved to 139.2 where 4 (σ , $\overset{3}{2}$ ad. ♀♀ , ~~1 young ♀~~) were prone at foot of Broken Bridge Draw, all facing leeward, hind necks & backs frosted with snow (9:40). σ rose & grazed, & an ad. ♀ too at 9:44. Ad. ♀ to pile & d & u. (about 20 sec.). σ moving about, with little snow on. 9:49, all 4 up & grazing tho still snowing. One ♀ d & u. same pile. 10 a.m., σ walked 30' to fence pile, ran last few steps, nosed it, d & u. in 15 sec., nosed another part, gave wolf howl with head vibrating & gaping lips shaking loosely, then walked 10' &, after a few trial heads of wrists, slowly lay prone facing leeward. The 3 ♀♀ had followed to 30' from σ . Snow continuous; w. breeze. 10:22, snowing steadily; σ up, looking at or beyond me, 150 yds. away in car, then grazed. ♀♀ do not try to remove snow on backs & tails. σ grazed 70 yds. from 3 ♀♀ , on about same contour. 10:30, rainy snow continuous. 10:40, fine light rain. The 3 ♀♀ went across slope 20 yds. above σ to 50 yds. beyond (S.), then returned to near σ . 10:45, snowing, very wet flakes; still at 11:10. The ♀♀ worked to 50 yds. S. of σ , then \nearrow back ^{to 50} 20 yds. uphill from it by 11:10. One ♀ d & u. on pile. Do ♀♀ move about more than σ or in grazing? 11:15, σ moved 50 yds. S., d & u. on pile. ♀♀ then to near σ , one d & u. on pile, then 10-60 yds. S. of σ . Only occasional patch snow on ground, this on Pycnophyllum tufts. 11:20, the 3 ♀♀ , together, 50 yds. from E. 139 tributary. 11:23, σ made brief stop at fence pile after moving to 50 yds. W. of ♀♀ . No reaction to truck passing down road, 200 yds. from the 4. 11:30, continuous light rain. The 4 at E. 139 tributary. 11:40, rain

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Huaylarco, 15000', Opto, Arequipa

arrived. 11:55, 3♀♀ walked 100' N. of 07, & 2 def. & u., one starting before other finished. One took 40 sec. Stream 4x volume of 07 & pulses each 1/2 sec. Then third ♀ d. & u. All on same pile. Head somewhat lowered & ears horizontal during d. & u. 07 then to different pile & d. & u., both taking 80 sec., initial defecation only 15 sec. Rain on & off (12 m.). Solid stratus overcast, almost calm. I drove back to 137. 12:05, 3 in SW Branch of E. 134 Draw. Ad. & juv. 50 yds. NW of 138.05 (same as 84.1² m.), & 07 walking from them back to group of 8 others 50 yds. NW of 137.8. In E. 137.5 Draw, 100 yds. from stream, 14 (2 juv.). 100 yds. SE of 137.5, 4 (2 juv., left eyes ok). One ad. pulsed stomach & nostrils & threw ears up to vertical but I heard no sound! These retired from road to SE side stream. One ad. 07 50 yds. SE road at 137.5. 12:25, ad. 100 yds. SE of 137.5. Still 14 in E. 137.5 Draw (4 lying down; weak sunshine). 9 across stream east of 137.6, several lying down. 2:35, 138.3, 10 (4 juv.) 07 across stream, coming toward road, & 7± at head of E. 138.2 Draw. Usual 4 on flat near head of E. 138.2 Draw, 07 of 9 apparently not attacking them (above narrowing of draw). Opposite 138.8, 9, at least 2 & probably 4 juv. 3:10, 12 07 07 in mouth E. 138.4 Draw, & 4 crossing E. 138.2 tributary near mouth. Still 4 on flat at head of E. 138.2 Draw. 3:15, the 9 100 yds. W. of km. 137.7. a lone 07 on slope opposite 137.5, but 07 of 9 did not attack it. 3:30, a juv. 07 of 9 d. & u. 07 of 9 went 50 yds. up draw, staring, & then 6 (prob. all 07 07) came across slope & 9 07 chased & stood 20' from them. The 6 stopped. The lone ad. 07 next to SW ran to 50 yds. from 6. 3:33, 9 07 gave chase again. The 6 across & down slope. 9 07 stopped &

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Huaylarco, 15000', Dpto. Arequipa

the lone one took up chase, accompanying the 6 across road + to edge flood plain where the 1 stopped + 6 went on 200 yds. down stream. 2 min. later the lone ♂ ran to the 6 + they across stream about opposite 137.3. The ♀ 50 yds. up slope W. of 137.7 (3:40). The 14 in E. 137.5 Draw on NE facing slope, 600 yds. from stream. 3:43, the 6 entering S. side of mouth E. 137.5 Draw. The lone ad. ♂ remained on green flat by stream from where it chased 6. 3:45, ♂ of 14, 1/4 mile from the 6, ran straight toward them, + they fled to N. side of draw + up rocky slope. 14 ♂ chased leader of 6 50 yds. up this barren slope, then stopped + watched the others pass. The 6 continued on to hilltop going N. 3:54, ♂ of 9 returning after a run up draw to NW. Two juvs. of 9 in playful neck-wrangling. Two ad. ♀♀ of 9 prone (3:55). Sunshine on + off. 9 ♂ runs to 100' short of ^{group} ♀♀ + defecates briefly on a pile. Testes prominent. By 4:05, the 9 on high flat of a hill, 300 yds. W. of 137.8. 4:10, the usual 4 came to foot E. 137 Draw down N. fork. Across stream from 137.7, the 6 seen earlier, only one a full adult, others juv. or yearlings. 4:25, adult at W. 138.1 Draw chasing 6, apparently all juvs., perhaps 1 juv. belonging with adult. 4:28, the 12 ♂♂ still in lower E. 138.4 Draw. Km. 138.9, ♂ with short L. ear + ad. ♀, at foot W. 139 Draw. 4:38, 3 ad. in bottom of E. 139 Draw, 100 yds. from stream. 4:43, 6 (1 juv.) on green wet slope opposite 138.8. Stratus overcast; fair wind.

January 29, 1952. All overcast 3 p.m. 3:05, 10 in E. 138 Flat opposite 137.8, 5 juv. (the former 11 ^{+ 9} probably). About 35 ♂♂ in E. 138.4 Draw. Km. 139.05, 2 ad. (♂ short L. ear) 50' W. of road, ♂ of 5 5 yds. N. of there, + the 4 ad. ♀♀ of 5 across road. The ♀♀ retired to 100' E. of Broken Bridge, ♂ stayed

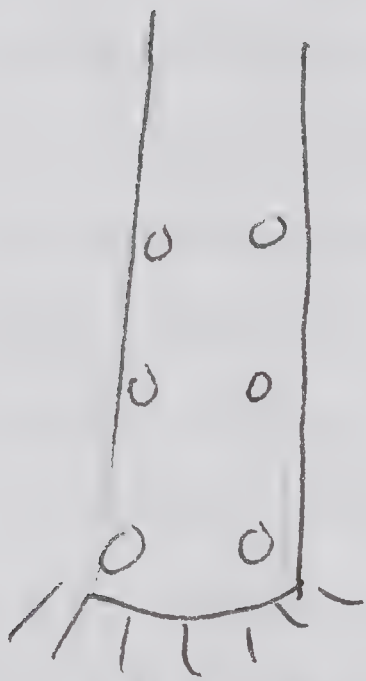
Vicugna

January 29, 1952.

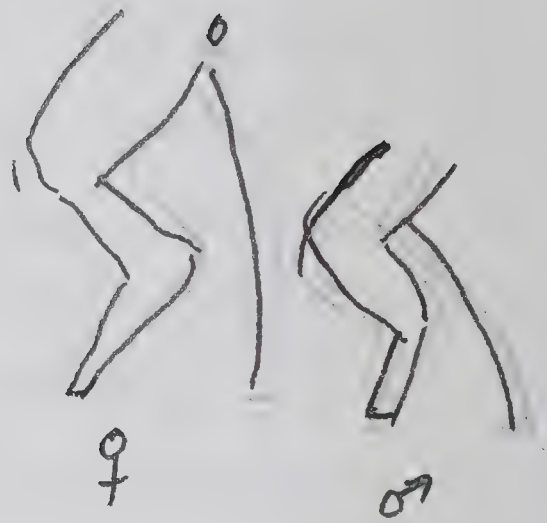
Huaylarica, 3000', Depto. Arequipa

100' W. of 139.1. Boundary between 2 + 5 hermits W. of from 139.1. Up E. 139 Draw only 1 visible; where is former 8? A truck coming down road; ♂ of 5 ran across road + stream, + walked toward ♀♀ in foot of B.B. Draw (3:20). 3:25, 34, apparently all ♂♂, in E. 138.4 Draw. 10 of 20 of them diagnosed juv. 2 or 3 fights between juvs. going on constantly accompanied by grating cries. 3 at E. edge of E. 138 Flat - the former 4? One astutle another, prone, in approximate copulation pose, 10± sec. By 3:35, all but 9 of the 34 had gone N. uphill from E. 138.4 Draw, urged in part by one large ♂ with arched tail. This ♂ then chased 3 more after the group, 6 up slope of Rocky Hill, going S; so that they were among boulders + yareta. 3:45, this ♂ still herding scattered 20 + 3's up Rocky Hill. Light tuft hair on right hunc. 3:48, the ♂ descending hill, grazing on way. It rubbed one side, then other, of head on scrubs then 1 high tale brush. 3:52, a lone ♂ ascended slope NW of 138.3; left ear tip 1" short. (Same as 139 ♂? - prob. not). 3:58, lone ad. ♂ still in E. 138.4 Draw, on slope of Rocky Hill. Another ^{ad.} ♂, alone, descended below road at 138.3. Ad. + small pole juv. 50 yds. NW of 138.15 (the lone ♂ acquired a juv.?). 3 (juv.) on flat near head E. 138.2 Draw. 4:05, "X" crossed to SE side stream, then walked N., then ran N. past 3 fighting juvs. (♂♂); "X" may be ♀. Cold wind, light sprinkle. The ad. + juv. retreated to 50 yds. NW of 138.1.

January 30, 1952. 9 a.m., 8 (ad.) in E. 137.5 Draw. 9 (the former 11 prob.) 200 yds. W. of 138. In E. 138.2 Draw, 5 on flat, 1 or 2 perhaps stray ♂♂. Just across stream from 138.3, 9, only 1 apparently ad. + 8 juv., one with white-tipped ears. 50 yds. SE of 138.25, several ad. + small juv. 9:25, a single ad. in E. 138.4 Draw. 138.6 Draw,



ant. view
neck "glands"



Vicugna

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Huaylarco, 15000' Dpto. Arequipa

two ad., ♂ with short L. ear! (the 139 pair). at stream at mouth E. 139 Draw, 7 (1 juv.), + 6 at foot Broken Bridge Draw. The 7 retreated up draw as car stopped on road, & ♂ of 6 then chased them up draw. Up stream 300 yds. from 139.25, 10 (1 juv.) - the W. 139.3 group? ♂ of the 10 ran to E. side of stream toward a group running past. 9:45, an ad. ran 200 yds. N. toward ♀♀ of 6, ♂ of 6 chasing, + 100 yds. beyond to top rocky hill. Then 6 ♂ chased 9 (2 juv.), prob. all ♂ of 6 N. from near mouth of E. 139 tributary (9:50), following them across stream at 139.3 + into lower W. 139.3 Draw. 10:00, 2 ad. still in W. 138.6 Draw. 10:05, 9 ♂ of 6 (8 juv.) across stream from 138.3. + 100 yds. SE of mouth E. 138.2 Draw. The ad. + juv. to 50 yds. NW of 138.1. 10:09 ♂ of 4 crossed tributary toward the 9, ad. + juv. on pile, then to 70 yds. from 9 + they retreated a few yds. 4 ♂ then grazed. The 9 just outside + N. of mouth E. 138.2 Draw, apparently out of the territory of the 4. One of younger 2 of 4 ran NE across draw (part of group?). By 10:20, 2 of 9 + 1 of 4 prone. Juv. of 9 with white-tipped ears is ill; walks slow + limping, raises + lowers head very slowly. 10:30, play fight among juvs of 9 brought group toward the 3 + were chased a few yds. away. 11 a.m., 2 at foot rocky slope S. of 135.1, both ad., + they went up rocky slope when car stopped. Both dirty; perhaps descended to drink. at foot of hills N. of 134.5, 9 (1 juv.), as seen before. at km. 133, 5 ad., + 1 ad. on NW. side road, + 13 (1 juv.) 150 yds. S. of 133.2. One ad. of 12 gave wolf howl shortly after a ♀ d. + u. on pile. 2 ad. ♀♀ then smallest juv. of group (also ♀) d. + u. on pile. The lone

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Huaylarco, 15000', Dpto. Arequipa

adult went parallel to road & crossed to S. side at km. 133.45. At 11 a.m., 10 of the 13 lying down, several on sides, in sunshine. There is definitely more lying down in sunshine than overcast weather. For sunning rather than just rest. Juv. 1404, ♂, found freshly dead Jan. 28 nr. km. 138, had in teeth purple flowers + fine compound leaves of small plant recently collected + also found in Tinamites crop. 2:15 p.m., 3 at stream at foot of E. 137 Draw, the one with bad L. eye remaining but smallest juv. missing.

January 31, 1952. at 7 a.m., 1" snow + overcast, drove up road from 137. 9 50 yds. NW road at 137.6 (former 11). Ad. + juv. at 138.1 at road (137.9, just below road, at 10:05 a.m.). Ad. with short L. ear at foot E. 138.6 Draw. 10 in ^{W.} E. 139.3 Draw. Returning, 10 a.m., saw 6 in across stream from 139.1. In E. 137.5 Draw, 50' from stream, 15. 100 yds. toward stream from 137.3, two adults. 10:15, 3 in N. fork of E. 137 Draw.

From here on,
1951 young
called "yearlings";
1950 young "1 yr. olds";
1952 young "juv."

February 6, 1952. Returning from Arequipa about 9 a.m. saw first at km. 133. There 3 (1 ^{yearling} juv.?) 50 yds. NW of road, 15 (4 + 11 or 5 + 10) 100 yds. SE of road. Single adult ♂ NW of 133.2. 134.9, 9 (1 juv.) as before. Opposite 137, 4 (Many says both ^{yearlings} juv. ♀). On NW side stream opposite 137.1, two adults (as Jan. 31 or Feb. 1, see M.K. notes). The 2 + 4 have boundary at ^{opposite 137.1} stream, the 4 being allowed to stay on NW bank for a time. Many has same notes on these, + on the former 11 at 137.6 which is now ♂ with a ♂ + ♀ young. Ju. of 4th in E. 137 Draw after given wolf haul (M.K. notes). But ♀?

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February 8, 1952

Huaylarca 15000; Dpto. Arapuca

8:10 a.m., 2 adults 100 yds. NW km. 137.2. 138.2, 4 (3 juvs. + 1 ad. ♂) 30 yds. to NW (the former 2?). One ad. in E. 138.4 Draw; it chased off 2 which had earlier run by the 4. 138.6, 17 ♂♂ 50 yds. NW of road. One gave wolf howl. Of 15, 3 in ^{youngest} ~~smallest~~ age class - a lone small yearlings. ~~The~~ short L. eared ♂ 50 yds. SW of the 15, grazing. Km. 139, 2 adults, ♂ with short L. ear! - so two like this within .4 km. Former has a shorter ear but not easily distinguishable. Up (at least 6 ad.) E. 139 Draw, at least 7; 4 ♂♂, only 1 adult, opposite 138.8. 8:45, turned back from Broken Bridge. 8:50, 8 of the 17 ♂♂ at 138.6 lying down, 3 + half on side; seen out briefly. 8:58, the 4 which had been opposite 138.8, at NE side of E. 138.4 Draw. One juv. had lips constantly agape & dripping as if in recent fight. Lone ♂ in bottom draw within 50 yds. of the 4, but this one driven by an older ♂ which ran down draw to the 4. At head SW Branch E. 138.2 Draw, group of 4 & 3. By 9:15, the 5 still near mouth E. 138.4 Draw, an adult ♂ 50' from stream there, & the resident ♂ 50 yds. up draw from latter. Closer ♂ whistled at me, ^{nostrils} ~~nostrils~~ pulsing, lips closed. Seen out; both single ♂♂ lay down + some rolling on side in grass. Both up 9:21. Moved to 138.3. A group of 6 (1 yrling, 3 ~~♀~~ ^{1 ad. ♀ not apparently pregnant, &} pregnant ♀♀, 1 ♂) at creek at mouth E. 138.2 Draw. 9:25, ad. ♂ + 3 yearlings at road at 138.15, ^{crossing} ~~crossing~~ toward stream. Some feces piles now completely covered with short new green growth. One rubbed anterior R. metatarsus with posterior L. metatarsus. The 4 grazed by stream. A ♂ (est. 2 yr.) ran up to 5 yds. from the 6 & was greeted with stares but no chase. It walked down toward the 4 a minute later. It stood stiffly near the 4. A yearling walked toward it & it walked a few steps away. All but ad. ♂ of the 4 crossed stream (9:45). This ♂ look-

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February 8/1952.


Haylarco 15000'; Dpto. Arequipa

ed hard, tail arched, at 2 ad. ♂♂ 100' N. of lower E. 138.2 tributary, & soon one of these retired to slope of rocky hill, 100 yds. to NE. The 4 crossed tributary but returned to SW side, the fifth staying near them. The 6 retired to flat of E. 138.2 Draw, NE of tributary - there 6 apparently the augmented former 4 here. 9:58, the extra one with 4 (♂ or non-preg. ♀) ran off up stream to foot E. 138.4 Draw, the 2 ♂♂ paying slight attention. The 4 to stream, & 1 crossed. All across, opposite 138.15, by 10:15. 2 of the 3 juv. have white tips to ears. 10:35, all groups took alarm. Other groups of 30± and 9±, ran down E. 138.2 Draw. The 30± some others crossed road at 138.2, going NW; others crossed about 138.4 or farther up road. No alarm calls heard. Group of 6 then seen in foot SW branch of E. 138.2 Draw, & several walked down E. 138.4 Draw. The 6 crossed over to Rocky Hill. By 10:40, cause of alarm had not appeared - probably dog or man. By 10:50, no dog or man appeared. A group of 6 loathed at head of E. 138.2 Draw, & a total of 20± in E. 138.4 Draw. I drove to Broken Bridge & locked down road. At 138.8, 11 a.m., 6 ♂♂, & being yplings, across stream on green mat. 11:10, E. 138.4 Draw, 7 & 10; ^{some may} ~~probably~~ be ♀♀. 6, apparently ♂♂, in E. 138.2 Draw. The 7 included an obvious yearling; the 10 all ad. - prob. both ♂ - ♀ groups chased out of usual territories. The 10 seems to be a group of 6 & 4. Two ♀♀ & ♂ of 6 d. + u. on pile. ♂ gave woff howl, then d. + u., urination took a full 60 seconds. Juv. of 7 a ♀. The 3 groups graze within linear distance of 60 yds. (11:30). 11:34, a lone ad. ♂ came down E. 138.4 Draw & stopped 100' short of 7, then chased 7 50 yds. & went on to feces pile, stopped short, nosed it. Beggin ad. ♂ of 6 came & stood 15' away, tail up, but resident ♂ chased it & its group.

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Huaylarco, 15000; Oato. Arequipa

100' up slope (to NE), then angled off to chase 4. ♂ of 4, tail up, stayed behind 7 & swerved from side to side, keeping between other ♂ & the 3 ♀♀. The lone ♂ then stood ½ minute & again chased the 7. The 6 & 4 went N. to hilltop while the 7 went SW onto side of Rocky Hill. A group of 6 ♂♂ from E. 138.2 Draw came onto the E. 138.4 Draw slope of Rocky Hill, & soon (11:45) 5 of them pruned. A ♂-♀ group of 6 (the residents?) grazed on flat of E. 138.2 Draw. At 11:53, the resident ♂ of E. 138.4, having gone after the departing ♀, came down draw to 20 yds. of 7, & the 7 then went 100' across & up hill on Rocky Hill, & the 6 ♂♂ took similar course. The lone ♂ did not pursue, but stood 50' up ^{more barren slope} ~~slope~~ from continuous grass for 1 min., then returned to bottom of draw & d. & u. on side. The 6, from hilltop, looked down, necks up & forward & ears in line of dorsal neck , looking down at lone ♂. The ♂ soon walked slowly up draw (12:00 m). 12:10, the 6 in E. 138.2 Draw as before. At lun. 137.5, 10 ♂♂. A single ad. ♂ near stream at mouth E. 137.5 Draw. // Many watched in afternoon.

February 9, 1952. Light snow last evening. @ 7:40 a.m., fog. Two adults at 137.1, crossing to SE side road. 138.1, 1 ad. + 2 yearlings. 138.4, ad. ♂ with short L. ear + 5 yearlings 30 yds. NW of road (7:45 a.m.). Fog clearing. Snow remained at bare tails of some. Two in bottom E. 138.4 Draw, 200 yds. from stream. The 5 yearlings gradually moved 70 yds. from the ad. ♂. Nearly all def. & u. - all ♂♂. One rubbed nose or raised tail another as latter urinated, then threw up head as in wolf howl. The ad. ♂ apparently alone but does not molest or graze. 8:10, lun. 139, 2 ad. ♀♀ 50 yds. W. of road. 6 (no yearlings) 50 yds. E. of

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Huaylarco 15000; Dpto. Arequipa

Broken Bridge. One of 2 to 50 yds. W. of 139.05. ♂ of 6 came across stream & road to 100' from it. Another adult (short L. ear!) ran between the 6 ♂ + the 2 ♀♀, then to pile & d. & w. The 6 ♂ stood, then seeing 3 across stream from 138.95, ran after them. These uphill going S. before 6 ♂ within 50 yds. 6 ♂ then back to its ♀♀ near Broken Bridge (8:22). Higher up bottom of E. 139 Draw, 7, all apparently ad, all ♀♀ pregnant appearing. 8:25, 9 ad. in W. 139.3 groups ^{crossed} ~~approached~~ stream at 139.25 & crossed road. 6 ♂ ran across old road (to bridge) & stopped 10 yds short of ♀. 9 ♂ ran to 5 yds. from 6 ♂ (which stood facing away) & d. & w. on pile. By 8:40, the ♀ retired 50 yds. W. of stream. all ♀♀ of the 7, 6, & 9 appear pregnant; those of the 3 doubtful. I returned to 138.3. Clear sky; no wind. Two in E. 138.4 Draw, ad. ♂ + yrly juv. (♀?); seen before 8 a.m. here. At mouth E. 138.2 Draw, 4, 2 being yrly, 1 ad. ♂, 1 pregn. ad. ♀. On side of stream nearest road, 22 (nearly all ^{1 or 2 yr.} olds), at least 19 being ♂♂, & a big ad. ♂ chasing but not ^{unsuccessfully} ~~road~~. 8:55, ♂ from E. 138.4 Draw ran down to edge of stream, followed by the yearling, & stood across stream from 10 ♂♂. The yrly of 2 half crossed stream & rolled on a grassy island. ♂ then crossed & drove young ♂♂ toward road up slope, chased 2 across, then went down & chased others up, chasing several to at least hilltop 100 yds. NW of 138.5, its yearling staying near it. This left 12 grazing on banks of stream nearest road. These 12 ^{nearly} all 1+2 yr. olds, as other ad. ♂ (of the 138.2 group of 3?) helped chase others to NW (9:05). By 9:08, the 2 back at mouth E. 138.4 Draw, ^(from) the ♂♂ which were chased 50 yds. NW of 138.5. This left ad. ♂ + 2 yrly near stream (the 3); then

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Huaylarca, 5000', Depto. Arequipa

(9:10) this ♂ chased 6 (the sht. left hand ad. ♂ + 5 yplings) 100' toward road, not vigorously. 1 sure, prob. both yplings of 3 are ♀♀. 9:15, the sht. eared ♂ chased yearling ♀ of 3 head for 50 yds., 3 ♂ pursuing + finally getting between the 2, sht. eared ♂ running across to SE side stream. Playful fighting among 3 of the ⁵ juv. ♂♂. "Shot car" d. & w. on pile 100' SE of stream. ♂ of 4 came + stood 50 yds. from it. "Shot car" 100' SE to another pile, tail up, then toward 4 ♂ to another feces pile. 4 ♂ retreated several yards, then chased Shot Car back (NE) 100', chase tail up + flee tail down. 4 ♂ then back to near group. The 3 (2 ypl.) at stream opposite 138.2, where chase of ♀ stopped. The 5 ypl. ♂♂ play + fight at stream opposite 138.4, unmolested, 80 yds. from Shot Car. 9:30, ad. ♂ of 2 lay on side, then prone, ypl. ♀ 10 yds. away grazing. Vicuñas sensitive to sounds. One started at 70 yds. when a few pounds snow fell from roof; others at 100 yds. at sound car starting. No calls, only look + run a few steps. 9:40, ♂ of 4 to stream, just NE of tributary mouth. At this the ♂ of 3 went to bank, + the two stood stiffly, tails erect, 3 ♂ with forefoot on grass clump for more height. ^(of 4) A ♀ came to 10' of the 4 ♂ but driven back by a start from ♂. Then 2 groups farther apart. Stream apparently repeated the 3 + 4 tho at one time the 3 group (then 6 or 8) ranged 100 yds. SE of stream here. 9:50, Shot Car on side, chewing cud. Both of 2 in E. 138.4 prone, 50' apart, ♂ lowest. Pure sunshine + calm. A few steamy clouds forming. The 5 ♂ yplgs. on lower slopes of W. edge of rocky Hill. Testicles of Shot Car prominent behind appressed legs - about thick thumb sized. 9:55, the 2 up + grazing. 9:57, Shot Car up + grazing. 9:59, ♂ of 4 d. & w. on pile which was now solid green. Then it ran toward the 5 ♂♂ + they ran 50 yds. across + up slope, ♀ ♂ stepping at edge of grass. 4 ♂

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then moved a fence pile & walked back toward its ♀♀. Three of the 5 yrl. ♂♂ in play fight & chasing. Short Ear paid little attention when they came close (10 yds.), but next time leisurely chased them 100'; its tail up. ♂ of 2 chased the 5 back onto barren slope, the yrl. accompanying, tail up. The 5 did not leave easily - at about 10' - & the 2 100' up from grass line after them. The 5 went across slope 100 yds. & back, & the 2 to 5' from them, then pursued 100' across slope to above Short Ear. 2 yrl. ♂♂ down slope & Short Ear gave brief chase, but no interaction between Short Ear & the 2 tho only 50' apart. The 2 walked back NE to bottom of E. 138.4 Draw. 10:23, 2 yrl. of the 3 crossed ^{to} 50' to on SE side stream. 4 ♂ started toward them but then 3 (3 yrl., 1-2 yr. old, all ♂♂ apparently) came NE toward & past the 4, & 4 ♂ ran parallel to them, its ♀♀ following. 4 ♂ stopped chase & Short Ear, tail up, went at them mildly. The 4 joined the 5 yrl. ♂♂. Short Ear chased a few briefly & all 9 went NE into foot E. 138.4 Draw. ♂ of 2, followed by yrl. ♀, ran 100' to them, ran parallel to leader which fled upstream, & chased it across rocky sidehill to opposite 138.6 or beyond. The other young ♂♂ soon followed. The 3 crossed road at 138.3 going NW. At 10:30 I looked up from note writing & found none in sight nearby. ^{Short Ear to ?} (dog?). At least 22 near stream & road at 138.8. The 4 are on flat near head of E. 138.2 Draw, & 5 ♂ (incl. ♀?) at narrow point at head this draw. Some of these batted in tributary. 10:40, the 3 150 yds. from road in mouth W. 138.1 Draw. 10:45, ^{137.8} 10 (2 yearlings) at stream & just SE of it. all ♀♀ ad. (7) ± pregnant. Three ad. crossed to SE at 137.7 (♂ & ♀♀). 10 ♂ crossed stream toward them & group followed, but no pursuit. In E. 137.5 Draw, 100 yds. from stream, a lone adult lying down. The 4 not

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seen there lately; ♂ injured & group dispersed? ♂ of 11 ascended mound at roadside, stood chewing and looking about for 5 min., then ^{at 11:00} crossed road. An ad. ♀ crossed ½ min. later. 11:04, ♂ ran N. up a low ridge. Group stayed near road. When car approached, the ♀ all to NW (♂'s side), ♂ watching from 300 yds. away. The ♀ then grazed near creek 50 yds. upstream from 137.65 bridge. ♂ 100' from the group by 11:15. Two adults 50 yds. SE of road at 137.55. One yrl. of 10 def. & ur.; apparently ♂. Occasionally an ad. ♀ blew at a yrling. One ad. ran a few yds. after another & blew at it. Occasionally one rolled on the thick bunch grass. 11:25, one bathed in fast-running 4-6" deep stream, then hiked back at yrling. close to it, then saved itself again 10' upstream. Then it lay prone on grass. A yrl. slowly lowered itself & lay prone in stream & remained down 70 seconds, then up & 15 sec. later down for 5 sec., then up & out of water. Perhaps both yrlings ♂ & ♂. ^{By} 11:35, 4 prone. ♂ remained on opposite side of creek from others of the 10. 11:40, one, then another pregnant ♀ gave wolf haul in ♂ manner before def. & ur. One repeated about 13X, nosing pile 5-10 sec. between throwing head up & shaking it, then def. on pile (urin. earlier before wolf hauls). First time ♀♀ ^{noted} ~~seen~~ to do this! 11:45, 4 prone (3 of former). One yrling, alongside & 3' away from ad. ♀. 11:45, ♂ crossed creek & ascended slope NW of ♀♀ & went SW across it, but stopped ^{all up 11:47.} 70 yds. from group & descended toward them a few min. later. One ^{yrl.} ~~prone~~ rolled on flattened bare spot. Other later engaged it in playful neck wrestling & tripping forelegs with head. 11:58, yrlings d. on pile in turn, & 1 urinated; at least 1 & prob. both ♂ & ♂. ♂ ad. lay on side for a few minutes, head & neck on ground. 12 M., all at 137.6 from road to



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Huaylarco, 15000', Dpto. Arequipa

100' ^{W.} ~~SW~~ All across by 12:02, grazing near side creek. 12:04, ♂ of 10 ran 50 yds. down creek & stopped, 50 yds. short of 4 adults. The two walked away down creek. 12:06, ♂ of the 4 ran up to the 10+ into brush, then away & stopped, 10 ♂ stopping 10 yds. from it, both with tails up. 4 ♂ then stood atop a 4' high boulder. 3 apparently pregnant ♀♀ in the group. In E. 137.5 Draw, 2 about 200 yds. apart, nearer (100 yds. SE of stream) apparently healthy ad. ♂. 12:10, ♂ back with the 4. Apparently boundary here near end of low ridge just E. of creek. 12:10-15, the 2 ♂ stood 20' apart, stiffly, occasionally one blowing at other or giving throaty growl. 12:17, 4 ♂ ran 100' past 10 ♂, then chased back to near own group. 12:19, 4 ♂ left group & ran at 10 ♂, 60' away, & chased it toward its group, then was chased back with low growls. ♀♀ of 4 ^{walked} toward road at 137.5, ♂ following but looking back often. // Mary watched the 10 in afternoon. M. says that this morning the E. 137 group of 4 came to W. side stream & stayed a while, while people outside near trailer (¹⁰⁰ ~~200~~ ± yds.).

February 10, 1952. Mary watched in km. 138 vicinity this morning. 3 yr. lvs. with ad. ♂ at 138.1. at 2:10 p.m. I left & drove slowly down road. Rain started, then hail. Encountered first vicuñas on flat at foot of hills N. of 134.1, at 2:20, all of course prone in hail, cranes below ^{hock} shoulder height. Cars horizontal, perhaps lower & drawn in. The 10 spread 50 yds., only 2 being side by side. By 2:30, hills white with the hail. Thunder & lightning. Backs & tops head vicuñas white with hail, & a dorsal band along neck. 2:35, flat ground ^{by road} white with hail. No wind so the 10 variously oriented. 2:50, still continuous hail but lighter. Occasionally one turned head or yawned. Hail about 3/4" deep on

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Huaylarco 15000; Dpto. Arequipa

hood of car. 3 p.m., still light hail. One shook head. One lay chin on ground, then another; chin up in 45 min. Heads above back level when hail light. 3:10, one extended a foreleg, nimbled at toes, replaced it beneath chest. Still light hail. 3:20, hail changed to snow. Fair breeze from W. Two more or less found storm but did not move. 3:30, snowing & blowing fairly hard. One rose & walked into wind, head below belly level & ears back, grazing. It touched nose to ground at various spots & finally defecated on feces mound, now white with snow, then walked on W. along foot of slope, grazing. Others remained prone. Snow at 30° angle 30° from W. 3:43, one ± facing wind rose, turned about, lay prone on same spot facing downwind. Body of 1 lies crosswind but muzzle points to leeward. 3:58, 3 now graze though snowing steadily. Prone ones, some that is, keep heads up, not low as in hail. Snow continued 1+ hrs.

February 11, 1952. Drove up road from 137 at 6:45 a.m. 2 ad.

at 137.5. About 300 ^{10 juv. NW road at 137.6.} in foot E. 138.4 Draw. Returning, 10 a.m., 6 in E. 139 Draw, 2 (1 short l. ear) just W. road at 139.4 on flat of E. 138.2 Draw. 4 (3 yrl.) 50 yds. NW of 138.1. 11:45, km. 139.3, 10 200 yds. N. of road. No yearlings. 2 p.m., km. 133, group of 3 ad. (1 ♂) 100 yds. S. of 133, & 11 (1 juv., 107) ^{juv.} 100 yds. beyond. Single ad. (♂?) 100 yds. N. of 133, & 11 ± about 50 yds. W. of it. These moved off to top low ridge leaving 1 ad. ♀ with a new born young. Young dark - wet? Ad. put nose to it often. Young could not stand but struggled to rise. Hail started & ♀ prone, ♂ also prone. By 2:30 the juv. had ^{10' from juv.} twice struggled to feet, hind legs spread wide. Up on arista

Vicugna

February 11, 1952.

Huaylarco, + 15000', Dpto. Arequipa

first as in regular rising from prone position, + juv. prone, not on side. Juv. held neck up well, occasionally shook head side to side. Ears very large ^{& held} ~~appearing~~ about horizontal by juv. Dorsally a milk chocolate color, near white lateral parts contrasting. Light band over eyes joining across forehead. Ad. nuzzled side, eyes, ear, chin, of juv. 2:45, juv. on feet for 50 sec., all legs spread, & turned around jerkily as if to nurse, then fell & assumed prone posit. with legs doubled under. Ad. ♀ with tail out much of time. Juv. neck up nearly all time (3 p.m.). Ad. nuzzled face juv., licked neck juv. 3:05, juv. stood 2 min. & worked under belly of ♀, & ♀ lifted & spread one hind leg, but no nursing seen. Young one can shake body. One ♀ of band came to 10' to inspect juv., retreated as mother blew at it. Then 9 ad., prob all ♀♀, within 100'. 6 of these prone facing away from hairy rain. Juv. up for 4 min. straight. When up once nudged on rear by foreleg of adult, once by a hind leg. Nearest other ad. to mother 10 yds. away, prone. 3:20, juv. prone, head up, for 8 min., mother grazes 5 yds. away. Continuous rain. Head juv. down when standing at times as if to graze. Mother nuzzled rear & juv. tail up. All but the mother of 11 ad. (+ lone ♂ ad.) prone facing away from storm. By 3:30 juv. had got along R. side mother & head up under belly of mother, trying to suck & probably partly successful. Mother stands, eyes half closed. 3:30, juv. again under ad. belly 3 min. & apparently sucked. Juv. shakes body occasionally. All group of 11 except mother & juv. prone. February 12, 1951. Light coat of icy snow. 1/10 clouds 7 a.m. At 7 a.m. drove down road from 137. 134.5, 10 (no apr. a juv.)

Vicugna

February 12, 1952

Huaylarco, 15000', Depto. Arequipa

200 yds. Km. 133, 4 ad. 50 yds. to S., 11 150 yds. to S., lone ♂ 750 yds. N. of 133.1. • 7:45, atop low ridge N. of 133, saw the 11 on flat at edge flood plain, apparent 07 100 yds. from other. Juw., ^{from ear} paler than mother (wet yesterday?), lying down. at 250 yds. Grouse took mild alarm. Mother led in movement away & moved 100' up slope beyond the ♀♀. ♂ prone 50 yds. from ♀ group. Juw. moved, standing at R. side mother, for 2½ min. Juw. can run at fair pace 5+ mph. 7:55, juw. prone, mother prone 10' from it. Juw. head & neck up. 8:15, 9 ♂♂, only 2 appar. full adult, 100 yds. SE road at 136.3. 2 ad. across stream from 136. 7 (who?). Usual 4 in E. 137 Draw. 137.4, 10 (2 yrl.) 75 yds. NW of road. 8:40, 138.2, 5 in E. 138.2 Draw, 1 yrl. & 1 slightly older & 1 bulgy ad. ♀. & another, & ♂ chasing a group of 6 (1 ad. & 5 yrlings.) just S. of mouth tributary. The shot left ear & lone ♂ on SE side stream at 138.3. ♂ of the 5 (former 4) ran at it, & at 80 yds. it fled to NE but not chased far (100±'). Apparently the SE side stream at NW foot of rocky hill now in this lone ♂ territory. 8:50, ♂ of 5 followed (dove?) its ♀♀ across tributary to SW side. 9 a.m., 4 in W. 138.6 Draw, apparently all ad., 150 yds. from road. Two in E. 138.4 Draw. at stream & nearly opposite 138.8, 4 ♂♂ ♂♂ incl. many ^{yrlings.} ♀♀. One def. & ur. in stream. Two geese landed. Yling. ^{approached} to 10' & geese walked off. Yling. walked after them 5 yds. & they off (O.P. photos some of this action. across stream to W. of 139.1, 6 adults as usual, & 3/4 ad. (1 left unsh. 1 ad. ♀ 1 1/2 yr. ♀). as usual 80 yds. W. of 139 marks sunny & considerable lying down. 1/20000. 9:25, 9 ad. on ^{W.} side stream opposite 139.5. Drove up road to km. 141 but saw no juw. An ad. ♂ which lay prone near road had L. hind leg broken just above ankle.

Vicugna

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Huaylarco, 5000', Depto. Arequipa

Returned to the group of 47 ♂♂ at 10 a.m. up to 4 pairs fought or chased at once (O.P. photoed fights). Then a yelping black dog came ^{W.} over hilltop & all scattered fast. I shot at dog & it ran back to E. // 1:45 p.m., km. 134.9, 10 100 yds. to N. Km. 133.1, ad. ♂ 100 yds. N. Km. 133, 2 ad. 50 yds. SE of, & 10 (all ad.), 100 yds. N. of 132.9. ♂ of 10 ran toward lone ♂ 100 yds.; finally left it at 132.05 & returned to its group (2:15). Went to top of low ridge N. of 133 but saw none to N. The 10 = 11 with juv. ^[no] ~~mother~~ mother & juv. ? // Juv. must have crossed stream at least 3 yds. wide & 6" deep to get to point of this morning. 9/10 cumulo-nimbus & fair wind from ^{NE} ~~the~~.

February 13, 1952. Drove down road from 137 at 7 a.m. 7:15, 11, no juv., at 135.3, 100 yds. S. of road - the 134 10?. At 133, 11 250 yds. to S., & 3 200 yds. to W. of them (11 & 3 as yesterday a.m.). 7:30 a.m., on low ridge N. of 133, 11 in loop of stream within 80 yds. yesterday a.m. site, the new juv. with them. About 7:50 juv. prone among Festuca clumps for 5 min. When up, juv. oft lay mother side. Juv. scratched over L. eye, head low, with R.H. foot tip. Top of back when juv. standing slightly higher than bottom of chest. 8 a.m., juv. head under belly mother 3 min. 10 sec., some breaks of several seconds. ♂ stays 80 yds. from ♀♀ & about 10' higher level. Legs of juv. very long & spindly. Knobs at wrists, & heels stick farther back than of ad. Juv. again put head under abd. mother but she walked & head drawn out. Juv. up to 20' from mother. Juv. nursed 3 min. 15 sec. at 8:20, from L. side. 8:30, juv. prone 2 min. 8:35-8:50, juv. prone. Then lay neck & head on ground, & ad. came to it & ~~so~~ nuzzled side, then face as juv. up. 8:55, juv. nursed 2 min. Then ad. walked away. Juv. after & put head between mother legs from rear, but

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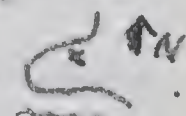
Huaylarico, 15000', Dpto. Arequipa

mother walked on. Mother toward feces pile. Juv. walked alongside others, tail up. ^{mother} def. + ur. on pile, then juv. spread hind legs + stood 5' from mother, parallel, doubtless def. + ur. No deep crouch. Sex? Juv. then followed slowly walking mother, head between its hind legs from rear. This went on for 3 min. + juv. probably sucked some, walking at same pace mother. While juv. at pile, a strange ad. ♀ nosed its side. Another ♀ ad. nosed base tail. 9:11, juv. lay prone. The ♂ prone 8:05-8:35, then to 150 yds. from group at feces pile, then to flat 100' from ♀♀. 9:20, ad. + yrling. crossed stream + ran to the group. ♂ came out after them but did not pursue closely. The yrling. stuck close to side ad. (prob. ♀, not advanced pregn.). About 4 ad. ♀♀ approached new one slowly + nosed base of its tail nose automatically. One stood 6' in front of new pair + blew into air. Two ad. ♀ in turn chased new one, tails up, about 5 yds. The 2 looked closely at juv., then grazed, unmolested, 5± yds. from nearest of group. 9:25 - juv. grazed 3 min. Juv. again to pile + may have d. + u. ♂ of group stayed 100' away while new ones joined so ^{14 in} to group (1 yr., 1 juv.). Juv. walked to 10' from ♂; mother seems worried + walked up behind juv., head high. The new 2 (9:30) loped 150 yds. from group without being chased, then ad. walked into center of stream + urinated (♀) while yrling. (prob. ♀) urin. on bank. Then the 2 100 yds. back toward group, ♂ coming 50' toward. 9:42, juv. prone. 9:45, ad. ♀ + yrling. off 100 yds. to S., + into stream where both (♀♀) urinated (9:48), then ran back toward group. ♂ went to pile near the 2, then ran at them, + the ♀ + yr. ran, + jumped across stream, + on to S. toward low ridge N. of 133.1. The lone ♂ prone 100 yds. S. of 133.5 for ¼ hr. 9:43, juv. with chin on ground in front of body. One ad. ♀, not mother, nuzzled juv. ♂ ran 50 yds., tail up, + looked S. at ad. ♀ +

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yrling on low ridge. Then 2 then back N., across stream, & ran past ♂ (50 yds.) & to the group (10:01). ♂ to pile, def. + ur., then only 50' more toward group (10 yds. away). New ♀ nuzzled juv. One chased ad. ♀ 10' & bumped it with chest or forelegs. Other ♀ walked toward odd one as if hostile. The 2 ~~ran~~ walked away 50 yds. N. Two grese walked away from them. Yrling stays close to side of ♀. 10:07, juv. nursing again. The 2 ran past bunch & 100 yds. to S., ♂ 100' from band toward them. 10:15, juv. prone again among. The 2 went 200 yds. N., downstream, where 5 others, 4 of which (pregn. ♀♀) inspected new pair carefully with muzzles, necks outstretched, while one stood grazing 50 yds. from them. ♂ of 11 (12 incl. juv.) stays 50 yds. from its group. 10:30, juv. nursed 2+ min. & mother grazed during nursing. Juv. stopped of own accord. Another nursing of 1+ min. at 10:40. 10:46, juv. prone again. The 2, well spread, placable. 11:13, ♂ of 7 came across stream & met by ♂ of 12. 12 ♂ spat at it, closed a few yds. tail up, then both in chase thru the ♀♀, then up slope beyond & 100 yds. & back, occasionally both standing 5 yds. apart. Cries heard. Fight broke off, 100 yds. from (NE) ♀♀, on pampa at higher level, & 12 ♂ returned toward group (11:18). The ad. ♀ & yrling. had come to the 12 soon after ♂ left & gone straight to juv. (up). ♀♀ gathered close. One chased the 2 5 yds. ♂ of 12 back & chased the 2 up slope. The 2 then descended & ran 100 yds. W. of the 12, ♂ chasing a little at first. ♀ ♂ of 5 returned to its group. The 2 (11:25) ran 100 yds. S. of the 12, not pursued. The juv. had risen at 11:13 when ♂ of 7 approached. At 11:18 juv. nursed. ^{up 11:29.} 11:25, juv. prone. 11:27, the 2 crossed stream 200 yds. S. of the 12 & ascended low ridge (about same point as earlier). 11:30, the 12 together near stream . Left. 11 & 3 on green flat S. of 133 as earlier, ^{ridge}

Acugna

February 13, 1952. Huaylarco, 15000', Apto. Araya
 3 prone. The lone ♂, prone 1/2 hr. 200 yds. S. of 133 1/2, up &
 toward the ad. ♀ & yrling. & watched them, standing 50 yds. N. of
 133.6. The 11 (all ad.) 100 yds. N. of 134.7 (about 135.3 at
 7:15 a.m.). 7, apparently ♂♂, 80 yds. across stream at 135.6.
 Usual 4 ~~at least 3~~ in head N. branch of E. 137 Draw (12 M). Overcast with
 little sun all morning. The 4 still there, near stream, at 1:50.
 Drove up road. 3 in foot E. 137.5 Draw. 9 50 yds. NW of km. 137.95
 (2 yr.) & 4 (3 yr.) 100 yds. NW of 138. 4 on flat of head ^{E.} 138.2 Draw,
 all prone (light snow). Km. 138.2, 3A (2 ♀♀?) across stream on green
 slope. 6 ad. in Broken Bridge Draw (2:10 p.m.). 20 ♂♂ in E. 138.4
 Draw. 2:30, 4 still low in E. 137 Draw but ran up when hill
 100 yds. when 2 horses up road to 136.9.

February 14, 1952. About 8 a.m. drove down road from 137.
 11 ad. at 134.5, 5 on SE side road crossing as car approached. One
 at 133.5. One from N. of 133 ran fast across road & chased
 another 400 yds. S. ♂ of the 11 on green flat also chased, then ^{returned} ~~retired~~
 to bunch. 14 (somewhat mixed but prob. 11 + 3) on green flat S. of
 133. Drove to top of low ridge N. of 133 as yesterday morning & found
 the 12 just over ridge up to 100' S. of stream. ♂ 60 yds. from others.
 Juv. prone. About 8:30 ♂ & 3 ♀♀ prone. Juv. rose unsteadily,
 walked straight to mother, tail up, & suckled for about 3 min.
 Stood at R. side facing 45° ^{toward} ~~from~~ mother. Mother nose side near
 tail & tail of juv. put down. Juv. mostly coffee ^{with} cream color. a
 fold of lighter skin makes a "smile" under eyes. Nose very black.
 Near white below. 2 min after nursing juv. prone on same
 approx. spot as before. ♂ returned to group & walked to
 N. side stream across from them, crossing 20' of shallow water.

Vicugna

February 14, 1952

Haylar eq 15000; Oct. 0. Areguipa

about 8:40 & prone; some sunshine. I was 150 yds. from group. When I started car, all up & across stream toward 07. H. was ad. at stream at 136.1. || 10:10, drove up road from 137. Heavy overcast & sprinkling. 8 (of 9 or 10?) 200 yds. up creek from bridge at 137.65. 138.2, 4 (3 yrl. as before) 50 yds. SE of road. In E. 138.2 Draw, 4, 07 at NE side of mouth, & the sht. L. ears low 07 50 yds. from it (to N.) at foot of Rocky Hill. 07 of 4 lay prone 70' from car on road, 3 yrl. grazed by it, but all up & away when a bicyclist & 2 trailers came along road. They fled to E. 138 Flat. || Mary & A.P. watched juv. near 133 in afternoon. It missed at 40-50 min. intervals. The 4 usually opposite camps were opposite 136.7 (across stream) about 4 p.m., in E. 137 Draw at 4:30 p.m.

February 15, 1952. Overcast. No precip. last night. At 7:20 I drove up road from 137. across stream from 137.7, at least 7 (the 9 prob.). Single adult at foot Rocky Hill opposite 138.3 (sht. L. ear?). In W. 138.6 Draw, 3, one with sht. L. ear (07 prob.), & 2 ad., one smaller than other. A group of 5 ad. (prob. 4 ♀) crossed to NW side road at 138.5 at 7:30. The 3 prob. same as often in W. 139 Draw. 139.1, 4 near foot B.B. Draw, 3 prone. Another on road at 139.4, then (same?) atop rocky hill E. of 139.3 (07 of the 4 below). 7:45, about 20, prob. 07 07, at 139.5. One at fork of E. 139 Draw & at least 5 up the S. branch of this draw. 7:50, 07 ran down to above its 4 ♀♀ (this group formerly 6). By 8:10 no change. At 138.3. Ad. & yrl. in E. 138.4 Draw, high on NE slope. 3 at foot SW branch of E. 138.2 Draw (the 4 reduced?), 1 a yrling. 8:20, foot of E. 137.5 Draw, 100 yds. from stream, ad. (prob. 07) with 2 yrlings, & 500 yds. farther up this Draw a group of 5. 8:35, at 137.65 bridge, 8 (2 yrl., the former 9)

Vicugna

February 15, 1952

Huaylarig 15000; Depto. Arequipa

crossed to NW side road at 137.5, while 8 (^{yr.} ~~yr.~~) remained 50 yds. on SE side of road. ~~Perhaps the same road + 6000, 2 groups.~~ The 8 proved a group of 8, only one full ad., at least 6 yrl. One of 2 ad. (from SE of 137.4) chased one ^{yr.} juv. + it finally got back to its group where it stood stiffly, switching tail side to side, as adult moved its side. One juv. ran to the 8 (07-2 groups) + was chased 100 yds. past the group by 07, then back to its own bunch, now on NW side road at 137.5, + 07 (of 8) chased these 50 yds. further SW. One yrl. left, chased by 1 of 2, crossed to SE side of stream + met ad. + 2 yrl., + soon ran on up E. 137.5 Draw. This left 7 07 07, + these herded away by 07 of 8 + ascended draw NW of 137.5, then to N. across slope 100 yds. from 77 of the 8, adult last in ragged file (9:00). By 9:05, 4 of the 8 (not 07) prone 100' from road (+ my car). All but 1 juv. rose when truck passed. Then it up, shook chest, + walked after others. All 8 grazed together. One ad. prone 9:15. Grazed on short stuff between clumps Festuca. One arched its neck + turned head on side + nibbled at spot on top back above foliage - about maximum possible bend of neck. The ad. + 2 yrl. left stream + hurried 300 yds. up E. 137.5 Draw (9:15). 9/10 cum. strat. || 9:43, km. 136, 19 07 07, 9 prone on Festuca slope, 7 yearlings. 9:50, km. 135, 6 ad. (the former 4?) 50 yds. N. of road. 9:55, 133, 12 prone 100 yds. S. of road in fine hard hail. One 100' behind others. 11 (1 yrl.) within 100', spread in file, 2 about side by side, apparent 07 ahead. I stopped on road. In 3± min. a ♀ ad. rose, then 07 a min. later, then all walked 100 yds. away from road (hail abating). A patch of hail on ^{rump} ~~slope~~ of each. During hail, ears horizontal or below (at times), some with chin on ground tho necks not far outstretched. At 10:10, atop low ridge. The 12 200 yds. N. of me, on W. side of

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Huaylarco, 15000', Dpto. Arequipa

loop of stream. Ad. Mother prone, juv. beside, but these rose at my stopping (in car). ♂ of group chased nearby group of 4⁺ then stood atop 4' high boulder (with all feet) & looked about. Juv. still has pale half-circle under eyes. 10:10, juv. walked 30' from its mother. Roused to a bush. Then to side mother, tail up, & nursed; mother put nose to side near tail (recognition?). Juv. at R. side during nursing, tail down. Mother stood quietly, ears up. 2 1/2 min. nursing, then mother walked 5 yds. Juv. pursued & nursed 15 sec. & broke off by self.

A group of 4 200 yds. NE of the 12, near stream.

10:25, group over a hump so only parts occasionally visible. 10:30, 3 yrl. (chased by 12 ♂ earlier?) ran past me, then E. atop the low ridge. Upon reaching ridge one looked toward the 12 500 yds. to S. & gave grating pulsing call, belly pulling in at each call, then all off to E. for Ylings can't give whistling warble? Of the 12 on the green flat S. of 133 (S. 133 Flat) one 80 yds. from others, ^{probably} ~~perhaps~~ a separate ♂ (the usual lone ♂?). By 10:34, at least 3 of 12 had crossed stream to E. side, inside of loop. 10:37, at least 5 of 12 ^{N. 133 Canyon} across stream including the juv. Then all across. ♂ ran 200 yds. E. & chased the 3 yrl. & another ad. from W. ran also after the juv. 12 ♂ then to pole while others stood closer to the fleeing (uphill to E) yearlings. Then 12 ♂ back to its bunch & stood close to & which had crossed to S. side stream. The ^{large ad.} other ran to this & then away to NE over a grassy pampa. 12 ♂ herded the 4 100 yds. up stream. One still remained on N. side stream (a 5th part of the 4 group?). The 12 (now seen to be 12 ad. + juv., increase of 1 since yesterday afternoon, are here ^{gravel} ~~pampa~~ ^{High ridge} ~~Flat NW.~~, about 500 yds. N. of km. 133.1. A group of 8 seem to flee up slope, going E.,

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February 15, 1952 Huaylarra, 15000; Dpto. Arequipa
 just S. of 133.7, chased by black dog. Those on S. 133 Flat
 watched but did not flee. 10:58, mother & juv. 50 yds. from others, on 20°70
 slope, & juv. lay prone. Juv. often holds head with chin high (20 ± 0) & neck
 back. This seen also on previous days. // A yearling seen in S. stance
 when near ♂ of ^{km. 137.6} 8 this morning. // 11:15, 8 scattered across stream
 from the 13. At some alarm the 13 ran 50 yds. up slope (E.), mother joined by
 juv. & running up above others. 11:20, juv. nursed at R. side mother for 1+
 min., stopping of own accord (1 hr. between feedings; possibly missed one).
 11:23, juv. lay prone among clumps Festuca, 10' from an ad. 11:48, a group
 of 5 (4 ♀♀ ^{or 5} ~~pool~~.) appeared 200 yds. SE across slope from the 13.
 The 13 ♂ ran to near them & the 5 ran ^{across +} down hill to the stream at
 mouth of ^{N.} 133 Canyon. ♂ then back to ^{100 yds. from} its group. Juv. still prone at
 same spot (11:54), but one ♂ 5 yds. from it. Never over 100' from adults.
 Much of time it is a matter of ^{mother} adult staying with juv., not vice-versa.
 The 5 ad. went NW across the flat of stream loop. 13 ♂ came down slope
 to flat 100 yds. from them but no closer. The group across stream from
 13 is 4 ad. All overcast & calm. 12:05, 13 ♂ went off toward place where
 5 reached stream (out of sight) & the 5 ad. soon returned to S. on the W.
 side of stream loop (where 13 first seen this morning). Juv. on side,
 neck & head up, legs flexed. 13 ♂ did not ~~cross~~ ^{pursue} the 5 across
 stream to W. 12:18, juv. up & it & mother descended 50' of slope to flat
 where others grazed. Juv. tried to nurse from one side then other,
 but mother gave it a kick with knee. Juv. to side of a pregnant
 ♀ but away when it quickly turned head to juv. Juv. then moved
 near mother & tried a Juv. to face side & urin. - like ♂ in
 slight crouch. Mother def. & ur. Juv. to it & nursed from R.
 side while mother still defecating. Mother moved back & back

Virginia

February 15, 1952

Haystack 15000; Dots. Acropolis

tail of juv. Mother grazed & moved along, juv. having to move to main
 10 sec. later
 fair nursing posit. Sucked 2 min. (12:22-4), then resumed, for 1/2
 min. Mother raised leg as juv. hit with blow of lower, then no more
 attempts. 1 hour between feedings; 40-50 min. yesterday;
 20-40 min. day before. Group feeding on short fringe of the
 133 Loop Flat at 12:30. 12:35, 11 on S. 133 Flat in group. 12:40, 9 ad.
 200 yds. N. of km. 134.2 (7 earlier). Across stream from 135.6, 19
 ♂♂ on green flat. A ♂ ad. from upstream drove them off. 3 pregn.
 ad. ♀♀ 100 yds. S. of 135.65 (♀♀ belonging to ♂♂ doubtless). Group
 driven into S. 135.5 Draw, then ♂ ran back towards its approaching
 ♀♀ (12:55). 11 M.K. & A.P. watched up road 3:30-4:30, A.P. down
 road to 6 p.m. A.P. said the 133 group with juv. near NW side
 of road at 133. She saw the lone ♂, & 5 ad. (4♀♀) across stream
 at 135.55. Two ad. ♀, not mother, seen to chase juv. a little.

February 16, 1952. Drove down road from 137 at 8:15.
 5 ad. (4♀♀) across stream at 135.55. At 134.5, 7 100 yds. to
 N. (♂ off?). Four seen running S. to low ridge S. of 133.3, the
 ♂ of 11 pursuing. 11 (1 yrl.) 150 yds. S. of 133. Two ad. (the
 former 3?) 400 yds. S. of 132.8. The creek here may divide
 territories of the 2 groups. From near 133 ^{an} ad. + yrl. ran
 to the 11, ♂ chasing them some. New ad. held tail vertical as
 others inspected it (prob. ♀ seen near N. 133 group a few days
 ago). The 2 grazed possibly 100' from rest of group (8:45). Calm,
 9/10 overcast, bright. I drove to top of low ridge N. of 133 &
 found the 13 (juv. not seen) among boulders high on slope about
 400 yds. N. of 132.7. I stepped out of car, & 200 yds. away one
 (♂?) of group whistled at me. All then around & up slope. at -

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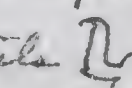
Huaylarco, 15000', Depto. Arequipa

9:15, S. 133 Flat granges were 10+3, 07 of 10 being 1/4 mile S. of 133.4 near lake inlet, where 3 others (ad. ♀ + yrl. + lone ♂?). ♂ walked back to group. I drove up road. Did not see 134 groups. The 5 at mouth of E. 135.6 Draw on short green grass. There evidently a resident group. Same 9:40. The 4 opposite 137 were on NW side of stream. Two adults 100 yds. SE of 137.2. They allowed me to walk to 80 yds. from them tho ♂ whistled at me. ♂ of the 4 whistled, much hoarser, at 200 yds., + the 4 went up Feetuna slope to SE. Bad L. eyed yrling still with these (100 m.). ♂ (2 yrl.) to edge stream opposite 137.2. across stream was ♂ with 2 yrlings. This ♂ to opposite ♂ + descended to stream level, + ♂ walked away to 100 yds. E. of 137.6. ♂ + 2 yrl. then retired 100 yds. up E. 137.5 Draw + all 3 lay prone + chewed cud. The ♂ (10:10) grazed at SE side stream E. of 137.6 + payed no attention to an ad. ♂ with 3 (2 yrl., 1 ~~ad. ♂~~ ^{ad. ♀} ~~ad. ♂~~) 100 yds. away + on opposite side of stream. Two yrl. in the ♂, one a sure ♀. By 10:20, the ♂ on W. bank of stream W. of 137.5 (100 yds. upstream from where chased before). The 4 across stream not 138.2 bunch as there seen (10:25) 100 yds. NW of 138. 10:27, the ♂ ascended bank; ♂ of 3 ran 50 yds. toward them + the ♂ descended again to stream level. 2 yrl. joined ad. ♂. One rubbed head, nearly inverted, in clump grass, then down onto wrists + rubbed neck, then up. The 4 graze 100' from the ♂; no animosity shown. They appear surely to eat the tall streamside bunch grass. A yrl. rubbed chest on bunch grass, hind legs up, then stood. 10:40, all of 8 except ♂ back across stream to NW side. The 3 50 yds. from ♂ 7 (of 8) but across stream. The 4, 50 yds. from ♂ ♂. 10:45, vicuñas look down road where 2 Indians walking up road at 137.2. ♂ ♂ crossed to

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Haylarco, 15000; Dpto. Arica

sun band. One whistled lightly. The 3 moved 50 yds. away but 8 remained fast as Indians passed 200 yds. away. 10:55, ♂♂ def. + ur. 2 yrl. scratched shoulder with hind foot, nearly at top back, forelegs slightly bent. 11 a.m., bicyclist passing up road caused no further alarm. Of the 4 NW of 138, ad. ♂♂ stayed nearest road & others retired 50-100' up slope at passing of men afoot. I drove to 139 & back but saw none from 138-9. 11:15, sprinkling. 11:20, parked at 137.55. The 8 still by stream, just upstream from the W. 137.65 tributary (boundary to SW?), & the 4 still across stream on slope. One yrl. of 4 urinated; ♀ 11:35, yrl. of 4 d. & u.; ♀. The ad. ♀ let labial ^{fall} feces ~~pile~~ when moved edge of feces pile. ♂ of 4 walked 100 yds. along hillside (upstream) from ♀♀ (11:37). 4 of 8 ascended 8' bank of SE side stream (the ♂ & 2 yrl. not in sight). Two ad. on green flat across stream from 137.2. 12 M., all 8 100' SE of stream at north E. 137.5 Draw. The two juv. d. & u. on same pile; ♀ & ♂. Later an ad. ♀ urin. on same pile; spurts 1/2 sec. apart. Some ♂ yrlings in groups at time when new juvs. being born! 12:20, all to 50 yds. SE of stream. 3 ad. ♀ d. & u. one pile, tails . One gave initial spurt 5 sec., then shorter spurts. ♂ on pile 10 yds. distant, took much longer to d. & u. than 2 ♀ in succession on another pile. One ad. ♀ moved tail of one urinating, then ~~she~~ ^{turned} head away quickly as latter blew at it. Yrling in S. stance as passed claw to male. Thunder, all overcast, fair W. wind. The 4 at edge of E. 138 Flat - there the E. 138.2 Draw group? - same composition. 12:30, 8 grazing together as before. Ad. ♀ to pile & d. & u., tail out horizontally (no throb as in ♂). The 2 ad. still on green flat near stream opposite 137.2 (12:35). // Hail, rain, snow from 1-3 p.m. 3:05, drove down road from 137. all overcast. The

Vicugna

February 16, 1952

Huaylara, 13000'; Qto. Arequipa

4 near stream just below mouth E. 137 Draw. ¹⁹⁰⁷⁰⁷ 2 near road opposite 136.3 (same group as last 2 days?). 4 ad. across stream from 135.5. Then on to 133 but saw none ~~saw~~ at far end of S. 133 Flat. Returning up road, 5 ad. at mouth ^{S.} E. 135.5 Draw. 4 ~~yr~~ 4 yearlings (0707 prob.) 50 yds. NW of 135.8; looked but no alarm as car stopped opposite them (3:50). 4 p.m., 2 ad. 100 yds. SE of 137.3. The 8 100 yds. E. of 137.55. 4:05, ad. 07 + 6 yrl. 20 yds. NW of 138.15. The lone 07, sbt. L. ear, atop ridge NW of 138.5. 6 ad. 60 yds. W. of 139.1 (4:10 p.m.; M. K. saw 6 this lunch yesterday p.m.). In upper E. 139 Draw, 7 adults (no yrl.). 4:15, 9 adults in E. 139.3 Draw. Several still have patches snow on backs. Commenced snowing lightly; SW wind. Across stream from 138.8, sbt. L. ear ad. 07, shorter ear than the one (still) at 138.5. 4 on flat of E. 138.2 Draw. 4:30, ad. 07 + 3 yrl. just S of mouth E. 138.2 tributary, grazing diligently in snow. 4:35, the E. 137 group (4) in N. fork of draw. Snow continued light.

February 17, 1952. At 7 a.m., sunnier than usual, drove up road from 137. NW of 137.3, atop hill, the 2 ad. (sleep on hill prob.). 7:05, the 8 150 yds. up creek from 137.65 bridge, 07 across creek from other, all in sunshine. 138.1, 07 (of 4, 3 yrl.) chased another yrl. up W. 138.1 Draw, then back down across road. The ³ yrl. followed 07, oft held tail up, & 1 ran 50' toward chased one (only young ♀♀ follow 07 so closely it seems). 7:10, ad. 07(?) + 2 yrl. ♀♀ ran downstream on SE bank stream opposite 138 (137.5 Draw gp.?). On flat of E. 138.2 Draw, 5 (incurs from former 4). 2 yrl. grazed at NE side of mouth of this draw (7:15-20). 7:25, 100 yds. NW of 138.5, the (longer) sbt. L. eared 07 alone. Tip ^{L.} ear curled

SR
Faisan 46-502 - Sam - 140 - W.

Red Ford 20-610 - Tam - 13B - W.

10/10/10

Vicugna

February 17, 1952

Heavy larva 15000; Opto. Arqyia

in somewhat; 1' shot. 7:35, at road & stream at 138.8, 40± 0707, many being yrlings. 1 or 2 fights going on. 138.9, 7:40 a.m., the "shorter" L. scared 07, alone, 50' SE of road. When car approached it crossed to 100' W. of road, to 50' from 2 ♀♀ (W. 139 Draw). 7:50, 5 ad. ♀♀ just below Broken Bridge, 07 across stream 100 yds. from them. ♀♀ walked across stream (one stopping to d. + w. in water) as car approached. 8 a.m., 8 ad. ♀♀ on W. side stream at 139.4, 07 100 yds. distant & across stream. I to 70 yds. from ♀♀ to photo, then 07 called & all looked at him, & ran away up slope, but 07 did not join. about km. 140, group of 50 0707 100 yds. W. of road. 8:10, 130707 on hillside km. 140½, 80 yds. to W. This should serve as census to km. 141. Truck came down road. None seen next km. Turned back (8:25). 8:30, 8 (1 yrl., ad. ♀♀) on E. side road at 140½ (count in census). 8:40, the shorter L. scared 07, alone, across stream from 138.8. 8:45, the shorter L. scared 07 at road at 138.6, apparently driving off 0707 (40± 30± across stream). At SE streamside (ft. E. 138.4 Draw), a 07 ad. chased the young 0707 of band downstream, ^{They grazed by stream with a grling (♀?).} not too vigorously. Short L. scared 07 stood 50' SE of 138.4, watching, then descended to stream. 2 yrl. 0707 held in stream opposite 138.3. 07 (with 3 ♀ yrlings.) upstream on NW side to opposite 138.2, tail up, scaring young 0707 to SE side of stream. 12 yrings. of big group 0707 left above 138.4, at stream, & 138.4 07 ran at them when they downstream to 138.45, chasing them upstream. Short L. scared 07 lay on side on grass near NW side stream, the 07 band across stream. 2/10 cumulated their census; no wind; warm & sunny. The 138.1 07 (with 3 yrl.) walked upstream in water, & a few yds. toward short L. scared 07 when latter crossed stream. These 4 then across stream opposite 138.2 (9:05 a.m.).

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9:10, 26 in yug. ♂ herd on flat SE of stream at foot Rocky Hill. Sht. L. card ♂, after grazing near then, suddenly chased 1 group then another. ♂ of 4 in E. 138.2 Draw, on flat bottom, came 50 yds. toward ♂ group & stood, tail out. 9:15, 2 ♂♂, raised upstream past 138.4 ♂ (which ran a few yds. toward, then stood atop boulder at NE edge mouth of draw). The ♂ + 3 yrl. grazes 50' across stream from 138.3. Of 22 in ♂ herd, ^{only 2 appear over 2 yrs. old.} not over 5 seem older than yearlings; Fight, with guttural choking cries, between 2 yrling. ♂♂ (9:20). 9:25, 4 (2 yrl.) in E. 138.2 Draw group. ♂ of these has not attached ♂ herd. 9:30, E. 138.4 Draw ♂ let 4 yrl. ♂♂ get within 50' of it before chasing a few yds. Sht. L. card ♂ about equally close; not chased. This one grazes within 10' of yrl. ♂♂ & only occasionally chases a few yds. 9:34, ♂ of E. 138.2 group came to NE edge of mouth draw & young ♂♂ retreated NE. E. 138.4 ♂ gave hoarse, wailing squeaking call toward fighting yearlings. This ♂ with blood along right lower jaw. Belly contracts & nostrils dilate as call given. Yrling. ♂ fights - little metacarpals; put to neck over others & little ^{leg} on far side. Defense is to lift & bend ^{wrist} ~~ankle~~, drop to ^{wrist} ~~ankle~~ when other leg better. Some hitting of necks & much sparring. Sht. L. card ♂ only 25 yds. from E. 138.4 ♂, nearer than any of ♂ group, but no chase. SLE ♂ prone on grass at 9:40, chewing cud. The E. 138.4 pair roll on grass. Tail thrown dorsally & neck too, & half roll onto back, in thrashing. Neck rubbed forward when down on wrists before hind legs folded. 9:44, a sudden scare & all dashed S. No alarm calls. 40± ♂♂ went up E. 138.2 Draw to head at a run. A few went to NW, crossing road at 139.2. The E. 138.2 group left slowly, walking up on to E. 138 Flat. A group of 6 ♂♂, grazing near 138.4, only ones nearby by 9:50. Cause of alarm did not app-

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ear. Probably a group to N. frightened by dog or man & ran into this area, alarming others. Earlier today saw 1000± sheep ½ mile E. of km. 141½. The E. 138.2 Draw group went S. from E. 138 Flat, over rocky hilltops, & down to edge of E. 137.5 Draw. The 3♀♀ arrived first. ♂ resident ran 100 yds. NE from its 2 yrl. (♀♀?) & the 3♀♀ fled to rocky slope. The 137.5 ♂ reunited faster. ♂ of 4 soon arrived & interposed itself between its ♀♀ & the 3 ♂, then walked slowly away along slope (to N.) at rear of its group (♂ often at rear). Two yrl. of 3 came to 50' from their ♂ (10:05). The 8 were at side of stream, just N. of mouth of W. 138.65 tributary, at 10 a.m., & ascended toward road or follow closely by 10:05. Yrling. ♀♀ stick with ♂ when no older ♀♀ in group! 10:15, the E. 137.5 ♂ grazed where stopped chasing; one of yrl. prone. The 4 (up 2 min. later) 150 yds. N. along ridge from 3. Chewing cud causes movement of muscle just behind eye bulge (toward ear). By 10:39 8 again near stream, one lying down. An aplomado falcon lands on slope 100' from the 3. They walked toward it, yrlings to 10'; gazing intently; all gave a start as bird flew & watched it departing. 10:40, 3 of 4 (not ♂) prone. One of 3 prone. 6 of 8 down, at least 5 flat on side, 4 with heads neck also flat on ground. 10:46, 6 of 8 down but all prone. 10:50, all 3 in ^{E.} 137.5 Draw prone on gravelly ground. The small white flowered *Nototriche* now in bloom on gravelly flats & gives appearance of widely scattered snowflakes. O. Pearson says turacos eat it. Also 4 trucks up road in 5 min. (10:52). all of 8 up & grazing. ^{The} prone yearling feeds too. Two ad. which were 100 yds. SE of 137.4 on flat, ran across road to NW at approach of a truck, & on up slope. 11:2:10, I drove down road from 137. The 5 ad. at foot of E. 135.5 Draw. 8 ran up slope ¼ mile N. of 134,

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perhaps disturbed by my shooting at a condor. The lone ♂ 100 yds. N. of 133.8. On S. 133 Flat, the 11 (1 yrl.) 300 yds. from road, 2 others 200 yds. SW of them. Light breeze; 8/10 cumulus; warm & dry. At 12:55 I arrived in car atop low ridge N. of 133. The 12 ad. 1 juv. on green wet flat 100 yds. N. of ridge. ♂ 100 yds. from rest. One whittled a bit. Juv. went to near ^{mother.} ^{great} But no alarm & soon grazing peacefully, ♂ 100' from others. 1:02, one ad. ♂ chasing another came N. to top ridge. 13 ♂ toward them; they stopped, then ran back to S. pursued ♂ to top ridge by 13 ♂. When juv. stands, ^{erect} neck ^{erect}, top head reaches height top of mother's shoulders. No long hair on breast. Hair uniform & short - like pile on mouton - & does not have cracks between blades of fur as in adult. No longer appears shiny. Juv. nibbled at wrist. 1:06, juv. prone 10' from mother on short grass (no clumps or snow). ♂ wandered E. atop the ridge. Juv. appears to nibble grass while prone. Tail distally held ^{down} by heels together as in adult. 1:08, juv. on side, neck & head up. A group of 6 (1 yrl.; with pregnant ad. ♀♀) 150 yds. NW of the 12 (♀♀ + juv.). 1:11, ad. ♀ d & u. on pile, walking 100' from group to pile & back. Juv. lay neck & head on ground. Hd. & neck up before 1:15. ♂ remains on ridge, 150 yds. from ♀♀. 1:17, nearest ad. ♀ 10 yds. from lying juv. Juv. head up, eyes narrowed to slits, to 1:27, then neck & head on side on ground. ♂ still 150 yds SE of group at 1:30. 1:30, juv. neck & head up. Juv. not seen to chew cud or surely to graze. 1:32, juv. up & walked to adult (50') which put muzzle to juv. head & possibly blew, then juv. on (an ad. ♀ blew at it) toward stream, over a rise, out of my sight, & all ♀♀ too. 1:36, juv. again in sight, ♀ group going downstream toward ♂. Juv. mouth makes chewing motions as it walks along. 1:40, juv. puts head under belly mother from R. side & is hit by breeze;

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then mother lets juv. suck & twice put muzzle to flank juv. Juv. head under belly 30 sec. & quit of own volition. Juv. scratches chin with rapid motion hind toe & is steady on 3 legs. Belly mother concave in profile (from scapular sternum). Juv. a week old this afternoon. Juv. rubs back of one metatarsus with other, from heel down, adult style. 1:48, ad. ♀ d. + u. on pile. Group has moved to 50 yds. from ♂, on sht. bright green contour near grass area. 1:50, juv. lay down (mostly out of my sight). 1:54, juv. up; apparently then lay down with mother. 1:58, 2 ad. ♀♀ d. + u. on piles 50' apart. 1:59, juv. up; looks face & nose of mother for 1 min., mother chewing all the while & not seeming to mind. Then mother up. 2:01, ♂ 20' from group; d. + u. on pile. Juv. apparently prone. One ad. ♀ prone but soon up (2:03). 2:07, ad. ♀ ur. on pile; then another on same pile. 2:12, ad. ♀ to a pile; ♂ quickly to it & she off. ♂ now pile & gives one "wolf howl". ♂ walks 50 yds. upstream. 2:20, ad. ♀ d. + u. on pile. ♂ went farther upstream. Juv. still out of sight (lying down apparently). An ad. ♀ prone 2:42; rolls & up. Juv. had not risen by 3 p.m. ♂ 80 yds. upstream from the 11 ♀♀. 3:08, juv. up. Walked straight to L. side mother. She moved juv. Juv. moved around rear to R. side & put head under mother abdomen. Mother moved flank near tail. Juv. rushed 2 min. & stopped of own accord. Then walked 20 yds. to feces pile (used by ♀♀ eat in). Spread hind legs, squatted, urinated 10± sec. (no defec.; apparently ♂). Roused pile, lurch. Bent R. wrist at rt. angle, then put it to ground & lay prone, 20 yds. from mother, at 3:14. While nursing it occasionally lifted one or other hind leg 8±" off ground. The 11 ♀♀ spread about 100 yds., 2 about 30 yds. short of top of low ridge where I am parked. Between feedings was 1 hr. 30 min.

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3:27, ♀ d. & u. on pile 8' from juv.; no reaction seen. 3:29, ♂ d. & u. on pile near ♀♀, then ran to top of low ridge where one ad. ♀ had reached. ♂ stood 10 yds. from ♀; it retreated to N. slope of hill. 3:31, ♀ d. & u. 10' from head of prone juv. Head & neck juv. up since 3:14. One ad. pregn. ♀ moved from pile & gave one "wolf howl". One ad. ♀ chased another 10 yds.; then stood 5' behind it & blew at it, pointing chin above head (facing away) of one in front. After 60 sec., the 2 relaxed & walked off. 3:37, ♂ off over ridge heading for 133 ^{area} at a run. 3:38, juv. put chin on ground, neck stretched ahead of body; then head on side on ground. Head & neck up when ♀ to pile 10' away. Often ♀ squats no more than ♂ in urination. 3:41, ♂ ad. back atop ridge standing atop 4' high boulder, looking to S.; then descended & grazed, going toward ♀♀ (3:42). Juv. up 3:42 & beside a ♀ which raised its rump, & accompanied ♀. All walk up to top ridge where ♂ & 1 ♀ stand 50' apart, juv. not always alongside mother. Led by ad. ♀, all over to S. side ridge (3:45). Crossed 100 yds. E. of the E.W. end of low ridge. ♂ led (3:50) & def. on pile 100 yds. N. of 132.8. Two ♀ def. on 2 other piles. Juv. walked alongside an ad. ♀ which quickly turned head toward it, & juv. scampered away. 3:53, juv. nursed, standing at R. side ♀, at rt. angles, lifting one hind leg from time to time. Nursed about 70 seconds; only 45 min. since previous feeding. The 13 spread about 100 yds. E. & W. Two ad. 50 & 100 yds. S. of 132.9. The 11 near edge of lobe, at least 500 yds. from km. 133 post, & about SE of that mark. Mostly gravelly puna there. Juv. ran near ♀ which gave a start; then juv. ran around in 60' diam. circle & stopped near same ♀. Juv. prone near 1' boulders (4 p.m.), then thrashed on side, then prone, again thrashed, rose, shake body. Juv. frothy. Put head under mother's belly, then ran

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in circle, then put neck over bare mother so that forelegs clear of ground, then ran about again (by 4:05). Again reared up & put neck over mother's rump; rubbed neck on mother's (down feeding). 4:07, juv. ran fast 50 yds., then back near mother - about ^{small} dog speed. Jumped up & put face to mother. Mother nuzzled juv. flank. 4:08, juv. down on grass, rolled. Genital area, ventrally, reddish-pink (hairless?). Juv. up 4:10. Near ad. ♀, not mother, which quickly put muzzle toward juv. (blew?) & juv. away. 4:13, juv. prone, thrashed 3x on side, then prone, then up (4:14). 6 ♀ now 20 yds. from 5 ♀ + juv. & 100' from latter group. Fair W. wind 9/10 overcast (cirro stratus above cumulus). 4:15, juv. prone in a path (bare ground); up 1 min. later. Ad. across road at 132.85; 13 ♂ ran toward, stopping for sev'l seconds at distances of 50, 30, & ^{finally} 15 yds. Other did not flee. The 11 returning toward S. 133 Flat; 200 yds. SE of 133 mark at 4:19. 4:22, juv. prone on bare ground 5 yds. from 2 ♀♀. ♂ grazed across road (boundary line?) from the other ad. (♂?). 4:24, juv. up. Ran back & forth 50' about 3x. Group walks toward ♂; ♀♀ 50 yds. N. of 132.8. Light rain. 4:28, ♂ of 13 60 yds. N. road to pile; d. & u. ♀♀ & juv. approached to 100'. One across road at edge road as ^{lyfne} ~~before~~ juv. prone 1 min.; behind her. Her into ♀ groups prone again (4:30). ♀ prone beside juv. (4:31) as group drew ahead, grazing. ♂ again on opposite side road from the other (133.4). ♀♀ draw 100' ahead of mother & juv. ♀♀ move away as an ad. comes from W. to about 133.1. 13 ♂ goes 50 yds. toward it & stops at fence pile. Mother & juv. up & run to ♀ groups (4:36). Lone ad. (♂ prob.) 100 yds. away & comes no closer. The 11 are opposite 133.2, 200 yds. toward lake or pampa. Juv. prone between 2 ad. ♀, facing away from rain; all up 1 min. later. 4:39, groups

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of 13 moose W. again. Juv. often has muzzle to grass or brush; exploring? 4:45, 13 ♂ ran 80 yds. toward the one to E; d. + u. on pile 50 yds. short of it (N. of 133.05), walked back to group. 4:46 1/2, juv. nursed standing at R. side mother, for 1 1/2 min. Breaks off by self; touches cheek of mother (its head turned toward juv.) with muzzle. Juv. then to feces pile + urinates [♂] (always after feeding?). Leaves pile, retreats + spreads hind legs (urin.?), leaves. 4:52, juv. prone in open, 5 yds. from ♀. ♀♀ d. + u. on 2 separate piles. One on still 50 yds. N. of 133.1, + 2 across road from the 13. 5 p.m., juv. still prone; rest of group grazing diligently. I left, driving toward 133 post. Juv. up, group walked W. in bunch + let me pass at 150 yds. in car. About 5:10, 5 ad. below coral opposite 136.3 - the 135.5 group prob.


February 18, 1952. Left 137 at 8:30 of sunny day + drove up road.

Ad. 50 yds. SE of 137.3 while other 100 yds. up slope to NW, Usual 8 at 137.6, ♂ 100 yds. from others; ⁺ several prone (early; sun). 138.2, ad. ♂ + 3 yrl. (took photo). 5 in the group on flat of E. 138.2. Drove. 6 ad. 50 yds. E. of 139.1. They walked across stream, ♂ 50 yds. from ♀♀, + 3 ♀ def. + ur. in stream, another upon roosting far side. 9 a.m., ⁹ in the W. 139.3 bunch, W. of 143.4 near stream. ^{9 a.m.} One had a nearly dry new juv. standing by it. Red + blue after-birth hung by strand from rear of ♀; fell + was left untouched. Juv. had no visible umbilical cord attached. Already it could run. Never over 5 yds. from mother. Mother 50' from nearest of rest of group. By 9:15 juv. had put head under belly of mother ^{5x} for long ^{little or} about as long as 1 1/4 minutes, + probably sucked some. No reddish in juv. color. Weak milky chocolate color. Ears of juv. erect. A string 4" long hangs from mouth. Probably several

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Hours old. Mother nuzzles it occasionally. Juv. only slightly wobbly up on feet continuously since 9:02. Wrists & ankles large. 9:21, again suckles, at R. side mother - for $2\frac{3}{4}$ min. 9:25, juv. clumsily lay prone 2' behind mother. Gravel & short grass substrat. No grass or boulder cover. Mother's chest sags as when pregnant, but belly concave & slight hollow at sides behind ribs. Mother grazes within reach of juv., or up to 10' away. Nuzzled juv. head, bending ear. Juv. head up constantly (9:31). 9:32, mother lay prone 6' from juv. Shifting forward of wrists prominent as chest lowered; metacarpal & hoof above ground before this shift . 9:34, mother up, grazing. Juv. eyes half closed; head away back as if in drawiness (9:37). Juv. Mother prone 10' from juv.; up in $\frac{1}{2}$ min., walks straight to juv., nose ends, grazes near. Occas. juv. on side & thrashes legs. Juv. up 9:41. Mother nuzzles its belly; juv. tail up vertical. Mother nuzzles base tail; it down then. Juv. runs around mother. 9:44, mother walked 20 yds. to group & drank at puddle in green mat for $\frac{1}{2}$ min. Juv. followed closely, lifting wrists high in walking. Juv. straddled head of drinking mother. Another pregn. ♀ touched noses with juv. another followed it, nose toward tail. Mother showed no resentment but walked 30' up hill from nearest other. Pregn. ♀ up to juv.; nose near it sev'l x. 9:50 Mother lay prone. Other stayed 1 min. & walked downhill. Juv. steps on prone mother, nuzzles her face. Mother, lips working, puts head to shoulder & belly of juv. 9:53, mother up. Juv. ran 10 yds. from mother; look over another ♀ toward it. No yearlings in this group all gone before newborn arrive? Smaller knob at base of juv. 9:56, juv. sucking, standing R. side mother. Mother nuzzled

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February 10, 1952 of juv. Huaylarco, 15000', Dpto. Arequipa
 base of its tail. Lower jaw vibrates in sucking. Mother stands patently,
 head up, ears about 20° up. Sucks 2 1/2 min., stops, then 1/2 min. Quile of
 own volition. 10:01, juv. quickly prone behind (2') mother. 20 yds. from
 nearest other member of group; 2 of other 3 prone. 10:03, juv. up. 10:04,
 all up & running to SE. Others 1/2 hr. up & down road
 also running. Source of alarm did not appear. First
 run of the ♀ was 200 yds. across & uphill (S. of W.
 139.3 Draw), then on 200+ yds. Juv. easily kept beside mother.
 Cannot be run down by man at 1 day of age (litter - bunch
 seen yesterday morning). No vicuñas reappeared in area by
 10:45 a.m. Calm, warm; 8/10 cirrus clouds. || I went to 138.3.
 Ad. & ^{upling} juv. prone in E. 138.4 Draw. 5 (♂, 2 ad. ♀, 2 yrl.) just S. of mouth
 of E. 138.2 tributary (the ♂ + 3 yrl. occas. there). Two ad. + 2 yrl. (all ♂ + ♂)
 came S into E. 138.4 Draw; ♂, followed closely by ^{the yrl.} juv., chased them
 50 yds. up side of Rocky Hill. When the 4 got to W. slope of this hill,
 the SLE ♂ at foot of hill chased them to foot of E. 138.4 Draw. The 4 ran
 past this ♂ & on NW side stream went downstream, but opposite
 138.2 they met ♂ + 3 yrl. + ♂ chased them into stream. ♂ of 5 chased
 them back. So the 4 ♂ + ♂ walked 50 yds. upstream in stream and both
 in ankle-deep water. Stream seems to bound the 5 & 4 when both
 groups present. 11:04, 3 ad. with a juv. about 1 week old crossed S.
 thru mouth E. 138.4 Draw. SLE ♂ ran toward them. The 4 crossed
 stream, juv. hurrying, walked downstream, again into water where
 juv. spread hind legs & others urinated. Grazed on bank up 100 yds.
 SE of 138.3. Juv. has slight constriction above knees. Juv. prone 11:09;
 noses & perhaps nuzzles grass. ♂ of 4 (3 yrl.) chased the 4 ♂ + ♂
 across road at 138.2. SLE ♂ crossed road at 138.35 & went 70 yds.


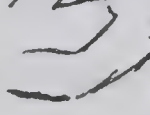
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up slope & grazed. The E. 138.4 pair prone among rocks on slope of Rocky Hill in sunshine (did not chase the 3 ad. + juv.). The juv. has more than usual depression in hair between eyes; short hair goes higher ^{long} ~~short~~. The 3A15. unselected. The 5 on flat S. of E. 138.2 trib. mouth as before. One ♀ in this group very bulgy. 11:16, ♂ (3 yrl.) attacked the 3A15; mother & juv. drew to one side & not attacked. ♂ heaved back hard at pursuer. The 3A15 ran stream & the 3 yrls joined them, but ♂ of the 3A15 quickly drove the yearlings back into stream. The 5 watched closely & came across tributary, & the ♂ & 3 yrl. crossed to 100' N. of them (11:20). SLE ♂ went on grazing. 11:21, juv. prone on gravel & lay neck & chin on ground. (once ♂ put nose to tail standing juv.). ♀ (mother?) prone 5 yds. from juv. 11:22, juv. up quick as ♂ came next to it. 11:23, juv. prone on bare ground.

|| afterbirth of the 139.3 mother examined when fresh. An outer sack with much cider-brown fluid, sack about 16" long. attached & inverted ^(?) was similar sac, no fluid, with rough ^{raw} flesh surface.

No placenta (?). With fluid the membrane weighed 5 lbs.; 1½ with-out. || Juv. left 30' behind grazing 3 adults (11:28); then 2 ad. to it & juv. up; prone again 11:29. 11:31, ♀ prone 10' from juv. 3 yrl. + ♂ are 50 yds. S. of 3A15. ♂ of latter 10 yds. towards a yrl. of other & ran into stream. One juv. half closes eyes; head up. The strange ♀, displaced by alarm probably, allowed to stay (in territory of SLE ♂ who is 300 yds. away to NW of ♀). 11:36, the E. 138.4 pair grazing on green flat 50' E. of stream. 11:38, juv. up. ♂ walks toward it; juv. away. Ruler nose on face mother, then to R. side & sucks; . Adult starts to graze. Juv. head knocked out by knee.  Juv. sucks again for 30 sec. before knee comes forward (in walking). 2½ min. nursing. Juv. immediately prone (not urinated. urination after sucking). 11:42, ♂ of juv. group ran 5 yds.

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toward nearest yrling. of other 4, 40 yds. away, + latter retreated. 11:44, juv. up. allowed σ^7 to move its side + bare tail. Juv. to mother after she rolled. Mother's tongue rapidly out + in as muzzles face of baby. 11:48, juv. lay on side by mother. Mother rolled on hind legs juv. Juv. rose + lay on side 2' behind mother. 11:50, σ^7 of 5 d + w. on pile at N. side mouth of E. 138.2 Draw; others of group gradually toward him. Both ϕ of 3 AHT prone, chewing cud. Slightly under $\frac{1}{2}$ sec. per chew. σ^7 of 2 groups 4 only 40' apart (11:53). The σ^7 + 3 yrl. group 100' across stream from 138.25. 11:56, non-mother ϕ of 1 up. Juv. remains on side, head up. 11:59, juv. + mother up. 12:02 $\frac{1}{4}$, juv. started sucking, standing right side mother \nearrow . Mother grazed, head forward, so juv. had difficulty maintaining contact (often broken). Finished 12:05, σ^7 of this 4 off 50 yds. to N. to feces pile + load. E. 138.4 σ^7 up its draw after 7 (prob. σ^7 or σ^7). Then it + yrling to near the juv. group, + latter up + 50 yds. downstream. σ^7 of these chased the 1 AHT group back. Mother prone; juv. to it. Mother licked its face 5 sec. Juv. rolled thoroughly on a sandy spot. 12:11, 11 ad. (pregn. $\phi\phi$) came S. into mouth E. 138.4 Draw. 12:14, σ^7 of pair toward, stopping 50' short of σ^7 of 11, But the 11 slowly washed away. ^{which approached.} For 5 min. σ^7 of juv. group followed one or other of its ϕ about, occasionally giving a squeal (nostrils flared). Second ϕ younger; perhaps not pregnant. 12:15, the 5 back S. of mouth E. 138.2 tributary. 7 σ^7 or σ^7 came down E. 138.4 Draw. 11 σ^7 , tail up, 100' toward + stopped. Rudent σ^7 chased the 7 100' up side of Rocky Hill. 12:20, juv. prone. σ^7 of juv. group ran a few yds. toward the 4 100' away + they retreated 5 yds. 12:22, juv. up. Made unsuccessful attempt to suck. 12:25, juv. prone 2 min. σ^7 again making long squeals, sometimes low + throaty, near mother. σ^7 cautiously put nose

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under belly juv. Juv. does not assume S. stance. 12:30, the 11
 graze at mouth E. 138. 4 Draw (pair resident not in sight). Juv. +
 mother prone (juv. behind) 12:30. ♂ prone & grazing 10' from them, then
 up (:31), nosed neck juv., grazed. 4 ♀♀ of 5 lying down. 12:33, ♂
 stands 6' from mother & gives squeals; perhaps spits. Mother & juv.
 rise, face away. Juv. sucks (R. side). 1½ min., broken off by
 approach & squeal of ♂. Then 20 sec. more sucking. ♂ nosed sides & tail juv.,
 tail mother. Another ¾ min. nursing 12:36. Mother licks face juv.
 5 sec. Juv. head drawn back but seems not to mind. This group
 ascending W. slope of Rocky Hill. Mother leads, juv. beside; ♂ in rear.
 ♂ noses back tail non-mother, then gives a squeal. Another 11 at head
 of E. 138. 2 Draw not attached. The 4 with juv. went along saddle of Rocky
 Hill 100 yds. up E. 138. 4 Draw. 12:48, mother & juv. prone side by side;
 up 1 min. later. 1438 were 50 yds. SE of stream opposite 138. 25. ♂ of
 5 ran toward & drove them to N. 50 yds. (stopped 50' sht. group).
 Another squeal from ♂ standing behind mother (facing away).
 12:58, now squeaking whistle of ♂ facing ^{rear} of mother (tail up
 vertically). ♂ seems to blow a spit. It went to head ♀ + latter
 turned away. Other ♀ does not raise tail. ♂ shakes ears - flies?
 1 p.m., 5 LE ♂ prone atop ridge NW of 138. 35. ♂ of 5, having grazed up
 draw to 150 yds. from group at head, runs at group & drives
 them up 50 Branch (7 of the 11; the others 50 yds. farther up
 the tributary where canyon narrower). All 4 of 1438 lying down at SE
 side stream. ♂ + 3 prong. ♀ comes down E. 138. 4 Draw: resident ♂ (100
 yds. beyond the 4 with juv.) ran down draw & they fled to near
 the 11, then grazed 100' from the 11. The 4 with juv. went S. to
 crest of Rocky Hill (singed by resident ♂? 1:09 p.m.). 11 8:30 this morning,

31.04.8 - yellow

gray box - red down - W. & P. M.

Virginia

February 18, 1962

Haylarco, 15000'; Pto. Arqueiro

3 at head of N. branch of E. 137 Draw. 1:20, ad. ♂ + yrl. + ad. ♀, at stream opposite 136.9, chased away 3 ad. (to 50'), including prog. ♀♀. at stream opposite 136.6, at least ³⁰ (♂♂ probably). The usual ad. + 2 yrl. in E. 137.5 Draw, 200 yds. from stream. // 2:45, 7/10 cum. under river, drove down road from 137. ~~40~~ 51 across stream from 136.5; prob. all ♂♂. 134.4, 8 ad. at foot of hills to N. // 500 yds. S. of 133.5, or yesterday afternoon. Lone ♂ at road at 133.9; crossed to 50 yds. N. of road as my car approached. Two at S. end of S. 133 Flat. Fair W. wind. At 3:15 arrived atop low ridge N. of 133 (N. 133 Ridge). 12 ad. + juv. were near the narrow mouth of N. 133 Canyon, on N. side of stream. All but ^{mother & ♂} one, 50 yds. from juv. (lying on side) descended over a bank ^{going} down to stream level (out of sight). // On W. side of N. 133 Canyon, NW. of the loop in stream, 6 adults grazed. // 3:26, juv. up & ran 50 yds. to mother. ♂ only left on upper level; mother & juv. descended to N. bank stream (N. of 133.2). The 11 may be on Pénase Pampa yesterday & today because drier than for several weeks! Lake reaches to 250 yds. S. of 133.5 now. // 3:36, all 13 back to the higher level. Much def. & ur. on pile. 3:37, juv. prone; up in 1 min. 2 adults 50 yds. S. of 133 past (2 still at S. end S. 133 Flat). Light hail. 3:42, juv. prone among clumps Festuca. Bunch now 200 yds. NW of stream. 3:45, the 2 ad. nr. 133 ran to 50 yds. N. of road, apparently as ♂ of 11 ran to road at 133.1. Lone ♂ now 50 yds. N. of 133.1; the ♀ of 11 100 yds. S. of 133.15. 3:47, 9 ad. of the 13 have moved down to flat in loop; one stays 10' from juv. Move quickly over Festuca slopes as if little to eat. // The 2 nr. 133 ran E. along foot of N. 133 Ridge. 11 ♂ stands across road from lone ♂ at 133.2 (road boundary?). // The mother & ♂ remained within 50' of prone juv. (4:05). 4:08, one of

Vicugna

February 10, 1952

Huaylarco, 15000', Opto. Arequipa

the lone 2 ad. went to road at 133.3; 11 ♂ ran at it to S. side of road. The lone 1 crossed road & was pursued hard to SW, 100 yds. beyond the 10 ♀♀, then gradually slowed down & stopped. + her other one ran to the 10 ♀♀. ♀ to it, tail up. ♂ ran 200 yds. back to group & rebated intruder back across road at 133.3. 11 ♂ stopped; other one 80 yds. to N. The lone ♂ watched but did not chase th in his territory. // By 4:14, all 12 ad. + juv. on flat in loop. Juv. prone by self 4:15, at foot slope among Festuca clumps. // The 11 spread 100 yds. One feces mound is only green spot for 20 yds. around in brown gravelly flat. // 4:20, nearest ad. ²⁰ 40 yds. from juv.; others 50 yds. farther away. // The range of the 11 S. of 133 now much like the 12 I watched there last Nov., & very probably same group (♂). The 13 I believe are same as were 15 + 17 but abandoned muddy ramps. Then lone ♂ moved in. // 4:30 ♂ of 13 went to NW corner of loop & chased an ad. ♀ downstream 300 yds.; then ♀ ascended bank, heavily. ♂ of the 6 followed on opposite bank for 50 yds. 4:34, juv. up. to mother 30' ft away. Together walked toward group, ran 100 yds. away. Juv. ran 100' ahead to feces pile. Assumed spread leg stance; 30 sec. later moved ~~into~~ pile; again spread hind legs. Returned to mother 4:43, tried to nurse. Tried again. Little success as mother walked. Mother to same feces pile. Juv. tried to nurse while ♀ busy on pile. no luck. Two ad. (both ♀♀ it appeared) stood parallel 5' apart facing opposite. One roundhouse tail other. Other gave kick back with leg on that side. Stood, min. then both walked off. Kecked - at one shook head, flipping ears, again & again. ♂ of 13 walked across stream to 20' from another, ^(♂ of 6?) d. & m. on feces pile on gravelly shore, then walked back across stream. 4:54, juv. to R. side

Vicugna

February 18, 1952

Huaylarco, 15000; Depto. Arequipa

mother. She pushed it to rear with head. Juv. then to R. side & started nursing. ad. stood quietly. Nursing lasted 100 sec. The 2 then into group. Juv. ran 50'; tail up. It ran quickly from ad. which reached head toward it juv. 5 a.m., juv. lay prone alongside grazing ad. || The 11 on Lanza Pampa, led by ♂, walked ~~to~~ E. to 200 yds. S. of 133.5. Light hail; 6 quickly prone facing E. About 70 yds grazing that area; compact it's probably. I left. Km. 136.8, 4 ad. (♀♀) 50 yds. SE of road, ♂ chasing 20± young ♂♂ across stream at 136.2. about 30 m. of ♂ band at road at 136.5. All dark overcast.

February 19, 1952. Overcast. Started up road from 137, in car, at 8:25. The 6A 24 crossing to stream side of road at 137.5. at 10 a.m. there were on S. 138 Flat; still at 10:20 (resident ♂ not home?). The 6A across from 139.1 at 8:45. In E. 139 Draw, the 7 ad., now with a new juv. well able to run around (2-5 days old, est.). Three in W. 139 Draw. One chased others & uttered fighting cries (♂ & ♀♀ usually there?). ♂ of 6 (not positive) chased another adult from mouth ^{E.} 139 Draw up stream to 139.5 or beyond, very fast. I left & returned up road about 10:15. Then 2 ad. at 137.5; 3 about 200 yds. up E. 137.5 Draw, as usual. The 6 on N. side of E. 139 Draw. 10:40, 2 of these prone the solid cum.-str. overcast. ♀♀ all appear pregnant & heavy. By 10:50, the 6 at bottom of Draw among "blue" bunch grass; ♂ 50' from ♀♀. ♂ seen with 8" ^{green} grass stalk in mouth. 11:12, one ♀ lay prone. 11:15, ♂ started to W. as a vicuña appeared atop slope 100 yds. W. of 139.1 (300 yds. from ♂). ♂ to fence pile & urinates, then to edge of stream. The new one the shorter L. eared ♂; it descended to 30' from road d. & u. on pile. The 6 or then ran upstream to 139.3 where another, coming downstream, ran

Vicugna

February 19, 1952

Huaylara, 15000', Dpto. Arequipa

E. up rocky hill (I think 6 ♂ followed soon). The 5 ♀♀ moved to N.
 Nearly all def. & urinated. By 11:25, the 2 ♀♀ with shorter ^{LE} ♂, 50 yds. W. of 139.1. 11:28, one of 6 ♀♀ prone; it up + 2 prone 11:31. Shorter ^{LE} ♂ gave a throaty grating high cry + ran a few yards after one ♀. Neither of these 2 ♀♀ appears heavily pregnant. Chased one visited feces pile, then stood with mouth agape, tail rising a few inches every 3-5 seconds. This is paler smaller ♀. 11:38, 6 ♂ back 100' up slope from 92. 3 ♀♀ prone. 11:41, 4 prone. ♂ ran 100 yds. across + down slope, to S., as an ad. ♂ ran N. along sidehill to near mouth E. 139 Draw. 6 ♂ d + w. on pile. Other, 150 yds. away, turned + ran + was joined by a grating (E. 138.4 pair?). The 3 worked N. along sidehill to 50 yds. W. of 139.2 (11:50). 11:53, only 3 ♀♀ of 6 prone. Two adults (♀ + ♂) came down E. 139 Draw, 100 yds. S. of tributary. 6 ♂ ran to tributary + the 2 hurried to SW along slope. 11:58, only 2 ♀♀ of 6 still prone. One holds tail out ♂ + knees not as far forward as usual (because of ^{swell.} swollen abdomen?). 12:05, only this one still prone. Then it up, walked to bare spot where another ♀ had rolled + now lay prone, + caused latter to get up. ♂ back to 100' from ♀♀. 12:10, I moved car to 139.3 on the group with ^{#2} juv. (now only 7 ad.) coming downstream to foot of W. 139.3 Draw. Juv. urinated, not on pile, & is perhaps a ♂. 12:15, juv. prone alongside grazing mother. 12:29 juv. on side; head leans back, eyes half closed. Mother grazes within 10'. A ♀ rolls in bare hollow - not used when wet! - yawns, ^{raising} upper lip when mouth opens, rubs side neck on adjacent grass. Can ^{wiggle} one ear back + forth rapidly. 12:30, juv. on side on before; neck goes back to about 60° + wiggles to vertical in dozing. Bright sky; diffused sunshine, ~~stiffer~~ ^{stiffer}. 12:35, 8 th. adult, the ♂, 50 yds. S. of ♀♀ at 139.25. 12:50, dozing

Vicugna

Febrero 19, 1952

Huaylarco, 15000', Depto. Arequipa

juv. up +, beside mother, walked 100' toward group. Mother to a "dust" bowl. Two scratches with rt. forefoot; again; then quickly down + thrashed twice each side; again on one side; up. A group of 4 came fast down W. 139.3 Draw, adults, apparently one chasing others + then three the 3 + then back up rocky slope, 7 of 8 herding them away. 7 then stood 50 yds. uphill, to SW, of 4. The mother with juv. had run 100' off from other 4; after alarm back to 60'; + juv. lay (12:57) prone on short grass. 12:59, mother + juv. back to same dust bowl + mother prone in it. Juv. lay back + thrashed 10x on one side, head atop 4 neck most of time. Then juv. on side in front of adult + she licked its head + neck. Then "kissing" for 15 sec., muzzles together + moving about, tongues of both going out + in rapidly (4x/sec.). 1:02, juv. prone 2' from side mother. More "kissing." Mother thrashed. Up. Nosed ground; scratched once (about 1 1/2' stroke back with forefoot) on ground; nosed ground; scratched again. Then wrists down + down on side + thrashed. Finger-ridged pink nipples, 4, close together (1" apart) seen on belly, farther forward than I expected, as 4 thrashed. Then 4 prone, juv. prone beside in the dust bowl (hard dirt but scratchable). 1:05, adult up; with juv. walked up slope. Drove (scratch with each front foot at one piece bare ground. Then on up to 100' up slope from 4 (7 had descended to them) + lay ^{1:14} prone, seeming to watch up road. Juv. stayed up, walked around mother, nosed ground; stayed within 2 yds. mother. 1:18, juv. prone behind mother, facing at rt. angles to her. Then juv. leans side on flank mother + dozes. 1:20, 1 of 8 ad. across road at 139.2, grazing. 4 of group were near road at 139.2. 1:45, a truck came up road. 200 yds. away vicuñas.

ulsemux
29-560 ang.
29-707 ang.

Vicugna

February 19, 1952.

Huaylarco, 15000; Dpto. Arequipa

started to rain. ♀ & juv. up when truck stuck at 139.3 & had to unload passengers. Vicuña walked across slope showing little alarm, ♀ with juv. leading. Group to only about 200 yds. from road when about 30 people walked up & second truck labored up. Disturbance lasted till 2:05 p.m. juv. tried or did feed at 2 p.m. 2:05, ♂ went 70 yds. down slope, toward truck, from others & d. & u. on prominent far side.

1:14, ♂ stood atop boulder on crest of hill 150 yds. N. of ♀♀. The 7 ♀♀ & juv. graze 200 yds. from stream on upper green flat of E. 139.38 ^{W.} Draw. I drove down road. Two in E. 138.4 Draw. The 6 in Broken Bridge Draw. At stream at 138, ♂ & ♀♀ 2 F-1. (loss of ♀ today). On S. 138 Flat, at top of slope, 100 yds. SE of the 7, ♂ ♀ & 2 yrl. (E. 138.2 group) (2:30). The 7 fed rapidly & vigorously on pinules of thick blue bunch grass. Feed at bare clumps or between them, heads & mouths working steadily. Rainstorm approaching. 2:47, light hail. 3 ad. & juv. (some or watched yesterday?) ran N. along hillside 200 yds. E. of the 4 & on into SW Branch. The 4 started that way at a walk. The 4 with juv. were running on SE ridge of SW Branch by 2:50. Hailing harder. 2 of 7 lay prone facing away from storm. Another down 2:53; 4th at 2:53½. The 4 ^(2 yrl.) at NW side of SW Branch all prone. 2:56, bigger hail; 6 of 7 prone in grass, 2 - 6' apart; ^{on ad. ♀} then came from 30 yds. away & lay prone 20' behind the 6. Chens of some on ground in hail. Eyes open. Ears horizontal. 3:15, still continuous hail. The 7 as before, very quiet. Hail at 45° angle from W. Ground white with hail. 3:40, hail turned to rain; stopped 3:42. One up 3:43, 3 by 3:45; last ^(incl. ♂) 2 at 3:50. Some shook head & body upon rising or soon after so some of raised hail removed. ♂ ran up slope upon rising as if looking for danger. all followed & grazed

Vicugna

February 19, 1952

Huaylarco, 15000; Depto. Arequipa

at edge of E. 138 Flat. Much rain in evening.

February 20, 1952. 7:30 a.m., a group of 7 came down S. fork
 of E. 137 Draw. ♂ + 5 pregn. ♀♀ + 1 yrl. ^(a non-pregn. 2 yr. old). Yesterday morning 7 seen
 in that draw too. I drove up road ad. + 2 yrl. 200 yds. up E.

137.5 Draw. The 7 (2 yrl.) 100 yds. NW of 137.9. 130 ♂ at mouth
 E. 138.4 Draw, residents not in sight. Group of 4 + 3 in head

of E. 138.2 Draw (?). At 8 a.m., 5 ad. ♀♀ in Broken Bridge Draw,
 ♂ 100 yds. up rocky hill from them. In upper E. 139 Draw, 7 ad. +

1 juv. 8:10, 8 ad. + 1 juv. at roadside at 139.4. When I drove up road,
 mother + juv. led retreat down hill + across stream (took head-down).

♂ ♂ from upstream ran down toward group + ♂ of 8 ran to 50 yds. W.
 of 139.5 to meet it. ♂ of the 8 distinguishable by pale band along L. side
 at division betw. lighter dorsal + darker side wool (noted weeks ago too).

Neck glands of ♂ more prominent than of ♀♀ - perhaps shorter hair on
 neck. Glands may be lower on ♂, lowest at edge of white hair in ♂
 + 6 ± "above (anterior) in ♀ (check this). Jaw. a brownish buff, ^{nearly} ~~pure~~
 white on front chest + underparts. Sticks close beside mother

in group. 8:35, the ♂ + juv. on near stream, working downstream. Bright;
 + often diffused sunshine; light breeze. 8:43, mother prone + juv. prone
 parallel on R. side. Mother chews cud; complete cycle 10 X 8 sec.

Up to 30 chews in series before stop (30 in 28 sec.). Can see bolus
 go down throat, then cud immediately come up at same rate. 5 sec.

from stop after 20 chews ^(complete L. to L.) to start. Again 5 sec. Cheeks empty
 until cud comes ^{up} + chewing starts immediately when cud

reaches cheeks. Mother watchful; stops chewing with cheeks full
 + looks about. Jaw: drawers, eyes half ^{or more} closed, ears +5° back.

8:44, group 100' downstream from mother + juv. Mother rises, then

29 231 day. Iron Ford - not dual. St Louis No. 1.

Vicugna

February 20, 1952

Huaylarco, 15000; Dpto. Arica

juv. mother 20' to fence pile; d + u. Urination 15 sec. Juv. stands beside. at next pile juv. spreads hind legs & holds pore 60 sec, urinating only (slight crouch, fine stream; ♂?). Mother moves bare tail & hind legs juv. & may delay urination. 1/2 min. later juv. spreads hind legs over pile for 15 sec. One pregn. ♀ lying flat on side has respiration rate 10/30 sec. Juv. to rear of prone ♀, nose close to tail; ♀ turns head toward juv. quickly & latter scampered 2 or 3 yds. Repeated 3x; last time ♀ definitely blew at juv. 9:05, mother prone; juv. on side beside; 3 other ad. prone & 1 lying on side - same time now. Another chew in q end. As somatonic & sec. to swallow & regurgitate end. About 25 chews before swallow; as many as 30. 1 sec. per cycle. 9:15, all but mother & juv. up. ♂ chews end 1 sec. per cycle as ♀♀. 9:22, bud. comes down road. Mother & juv. up (200' from road) & walk away. 9:25, juv. nurses 1+ min. Then stops by self. Holds side head & neck on chest mother. Then down on bare ground, prays then thashes 4-5x on each side. ♂; inguinal region pink but tip penis may be black. Mother prone & juv. prone beside. Both up to 9:30. Juv. can shake tail side to side rapidly. 9:42, juv. prone on short grass; mother 10' away. ♂ d. + u. on pile 50 yds. upstream from ♀♀. Browse now near foot E. 139.3 Draw. Juv. for awhile in prone posit., ^{but back} hind legs to downhill side so lying on R. flank. 10 a.m., juv. still only one lying down. It stretched neck forward & put chin on ground, ears 45° back, eyes half closed; remains thus 2 min. Then head & neck up; drawing. // 10:05, the 6 ad. at top of hill at head of B. B. Draw. 10:15, ♀ & ♂ adult 50 yds. apart opposite 138.8; ears outst. Opposite 138.7, ♀ ♂ ♂; one lumps (R. fore & hind leg



Vicugna

Febrero 20, 1952

Huaylarco, 15000'; Opts. Arceuthobium

injured); 1 or 2 yr. old. ~~to~~ 5 young ♂♂ 50 yds. NW of 138.7. The 5 or 100 yds. NW of 138.6. Od. ♂ + 2 yrl. 100' upstream from upstream edge ^{Resident or after about 2 yrl. ? Probably.} mouth E. 138.4 Draw (10:20). A 4 in the upper E. 138.2 Draw group. 10:35, the 7 (2 juv.) at road at 137.8. 10:40, 2 yrl. + ♀ of E. 138.2 group of 4 ascended to E. 138 Flat; ♂ 100 yds. S. along slope from them (E. of 138.7). 100 yds. S. of ♂ is group of 2 ad. + 6 yrl.; ~~one ad. + 2 yrl.~~ one od. or turgid ♀! By 11:05, the 4 50 yds. across stream from ^{137.8;} ~~138.~~ spread 100'; or separate from the 3. 11:10, 3 of the 8 lying down. Second ad. may be non-pregn. ♀; slender neck (no ♂ in band? or ♀♀ with yrl. ♂♂?). 11:20; mystery solved - a big ♂ 100' uphill from rest of group. Two yrl. fight playfully; one bites dorsal neck other; one kicks at other. 11:20, ♂ of 4 (11:20) prone downhill from ♀♀. It stares at distant object, ears rise quickly to vertical, head raises vertically a few inches, stops ^{chewing} ~~then~~ and. Then ears drop back & chewing resumes. ^{of the 9,} 11:37, ♂ some yrlings. prob. ♂. One d. + u.; appears ♂. Another to same pile, moved it, gave "wolf howl". 11:37, ♂ of 4 ran 100 yds. at the 9, & they uphill. ♂ of 9 put tail up but rather than retreating seemed to drive its pregn. ♀ up slope. 4 ♂ quickly back to own bunch. The 9 100 yds. up slope from stream; grazing probably pan-there & hilltop undefended. The 4 then to slope ^{E.} of 137.7. 11:45, 8 (mostly pregn. ♀♀) ran N. from ^{E.} 137.5 Draw toward & past the 9, going NE. The 9 & 4 also ran then but more slowly. The 8 ran or across S. 138 Flat into E. 138.2 Draw. The 9 followed similar course, ♂ 20' in rear, at slow run. ♂ of 4 followed the 9, its 3 ♀♀ 50' to side. The 4 then slowed to walk but continued to E. 138.2 Draw. Alarm communicated by running? 12:30, 3 ad. + 1 juv. in E. 137 Draw, going N.

Vicugna

February 29, 1952

Huaylarca 15000; Dpto. Arequipa

Same as seen last 2 or 3 days? 2:15 p.m., I crossed stream opposite 136.7. Water 5" below chute at deepest. Left legs high in walking, for + urinated in stream. 2:15, I drove down road, 137 to 133. 5, possibly 0707, on S. 133 flat; a single adult 100 yds. from them. I walked to top of N. 133 ridge but found none up N. 133 Canyon. Drove up road. 07 of 2 at stream opposite 137.25 chased 6 0707 near road toward stream. 3 others, yrl. 0707, on opposite side road not involved. 3:15, km. 138.1, ad + 3 yrl. 200 yds. NW; the E. 138.2 I saw group 50 yds. beyond stream on S.E. side. 138.7, 14 0707 near stream; at least 8 yrl. large. The 6 ad. across stream from 139.1. 7 adults on S. side of E. 139.2 saw, 200 yds. from stream; now 2 juv. (one since morning?). The (est. 1/4 day) never one, fur rumpled but dry appearing, rose unsteadily at 3:35 + nursed at L. side mother for 3 min. 15 sec. Prone 1/2 min. later (other juv. also prone). Wind + light hail 3:40. One of 7 ad. + 3 of 6 lay prone. Hail stopped; the 3 up (3:45). The 6 to 100 yds. N. of 7 ad. 07 of 7 stayed close to 6 then to his own 7 - within 10 yds. at times. The 6 on S. side tributary working downstream. 3:53, older juv. up + nursed at R. side mother for 2 1/2 min. The 2 then walked across slope 10 yds. 3:57, younger juv. up; mother moved its fore + neck. juv. held tail up. Both walked 10 yds. Mother d. + u. on pile. juv. spread hind legs + squatted - I saw nothing fall. Older juv., 5 yds. downhill, also squatted on a few pile. New juv. walks well; slightly unsteady; prone alongside grazing mother 4:01. The 7 50 yds. up slope S. of 6, 18. 07 of 7 which is 10 yds. from G. + 03 1/2, younger juv. up; head under chest, then belly, of mother; nurses 15 sec. Then to L. side + nurses 1/2 min. or less. Mother grazes, walking. juv. walks under

Vicuña

February 20, 1952

Huaylarco, 15000', Dpto. Arequipa

her chest & out other side, apparently bonding neck only. Heavy light bulgy crescent under eye younger juv. makes runs of 5 yds. at mod. speed. 4:07, young juv. prone. Older still up (O.J.). 4:08, OJ put head between mother's thighs from rear; mother turned & moved side of OJ; then permitted nursing, j. at L. side. after ¹⁰⁵ 45 sec, mother grazed & walked forward. OJ tried to get head in again but pushed out by knee of mother. 4:11, OJ prone by mother. YJ, darker than OJ & thus harder to discern on rocky hillside. The 2 prone juvs. 10 yds. apart. One tergid ♀ of the 6 carries tail a little out from rear. At times recently seen in other pregn. ♀♀. 4:17, YJ up; runs 30 ft. across & down slope, preceding mother. Then nurses at L. side mother - stops after 10 sec. & withdrawn head - then resumes. Another ♀ moved YJ at base tail; tail raised vertical. Nursed $1\frac{3}{4}$ min., broke off, then 15 sec. Out quickly, as or near. OJ spit into air in various directions. OJ moved base tail YJ. Mother stood stiffly, back to OJ, tail vertical. OJ seemed to bite ear of juv. & latter quickly dashed & to mother. OJ came 5' from mother of YJ - latter mother spit ^{or blew} at it. 4:25, the 7 + 2 juv. to E. across slope 200 yds., juvs. close by mother. OJ ran 20 yds. from mother, then back in circuit. Stopped by ^{male} ~~mat~~ & raised tail when OJ snuffed flank. OJ blew at OJ. OJ followed by mother ran uphill in a 50 yd. diam. circuit, OJ following 10 yds. behind. Again OJ seemed to chase OJ for 50'; mother overtaking. OJ ran from mother past OJ, then mother after ~~as~~ ^{and} OJ ran ~~to~~ parallel. 4:33, YJ lies prone beside grazing mother. 4:33, OJ nurses, L. side, 2 min. (or +) before mother walks on. 4:37, OJ prone. YJ up, walks 10'; again prone alongside grazing mother. The 2 juvs. prone 20' apart, heads & necks up. 4:45, snowy rain starts, mother

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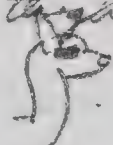
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stays within ^{5 yds.} of YJ; 10 yds. of OJ. 4:57, both juvs. up & walking up NE branch of draw with mother. Snow at 45° from W. The G, or leading & one ♀ trailing 50 yds., walked N. to Broken Br. Draw.

February 21, 1952 At 7:10 drove up road from km. 137. 2 ad. at km. 137.3. 542Y 50 yds. ^{with} ~~daughters~~ from 137.65 bridge. 1A3Y 150 yds. NW of km. 138.1. 7:30, the ^{ad.} 7 in upper E. 139 Draw near Bad.

(+ 2 juv.). 6 adults on slope 100 yds. across stream from 139.1. 7:45, Bad. + 1 juv. in foot W. 139.3 Draw. Curr. str. overcast. Watched the G & J.

Juv. ran up to 50' from others & back. Makes small jumps ^{straight} up into air at times when running, or ~~over~~ standing - about 6" jumps up. Juvs. prone on unvegetated spot 7:58. 8:03, truck stopped nearby & men walking on road 2 min.; juv. up & ~~no~~ ^{all} but 2 of group moved 30 yds. farther away from road. Juv. moves ground, working juv - eats frage? It lay prone 1 min. Both forelegs bent at once as starts down. Juv. ran in circles around mother, up to 50' away. Then rubbed against her side. Then put head under abd., tail out. Out & to other side. Back to R. side & suckled 80 sec. standing on R. side facing ^{8:18 a.m.} ^{AM.} ^{↑ J.} Nipples about 1" long, U-shaped, no udder or sag below horizontal in belly mother. Anterior nipples even with anterior edge thighs when standing. Juv. prone 8:20. Does not chew cud. Neck .

Respiration rate juv. 40/32 sec. 8:28, up, then prone in opposite direction in "dust" bowl. To mother & put nose to L. side - mother not more 1' from juv's. Juv. walked off. Juv. hit tip of branch of thorn bush. Adults put lips tight against ground in fleeing. 8:32, juv. prone. ♂ ran across stream (hind legs spread wide apart in walking in water; some swimming?) & to fence pole 100' beyond (100' W. of road at 139.4), & d. & u. there. Juv. up (8:35) &

9 a.m. - E. -

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♀♀ moved across slope to N, 50 yds. 2 ♀♀ d. + u. on pile in succession. D. + u. at same time (one). ♂ back to group. 8:49, mother with juv. walks E. across stream to 50 yds. from others; lies prone. Juv. stands. They touch noses. ♂ crossed stream again to near road. Pick up come down road; ^{mother} + juv. up; walk 100' upstream. Juv. jumps up + down + prances around mother. 8:47, mother prone on gravel of streambed. ♂, ^{up bank} head low, runs E. to edge road + stands; then to 20' up slope to E. of road. Prays. 8:49, mother up. Juv. beside. Mother now bare tail + juv. raises tail vertically. 2 ♀ d. + u. - about 1/2 min. - half time of ♂. 8:55, mother grazing 10' from juv.; juv. with nose to forage most of the time. :58, juv. lies down. 9 a.m., all ♂♀ walk 50 yds. to mother (♂ layed); juv. up; ♂ to edge road above them. ♂ descends + ♀♀ walk away from it. One ♀ ^{blows} ~~spits~~ at another; second blows into air (steam), not toward other. ♂ approaches mother + she gradually walks away. 9:05, all ♀ on flat on E. side stream at km. 139.55. 9:12, ♀ d. + u. - 25 sec. total. Juv. close to pregn. ♀; driven back by quick turn of head + neck toward. Group near road as big truck comes up road; to 50 yds. W. of road when truck 400 yds. distant. Down to stream, 80 yds. from road, as truck ~~past~~ them. Then farther away as men from second truck walk up road, mother with juv. leading. The group to 200+ yds. W. of road, out of sight of it (disturbance to 9:25). Then parked at 139.15. The 6 ad. now in Broken Bridge Draw. One pregn. ♀ very heavy in rolling, & in rising made 2 tries (throwing weight forward) before it could ^{raise} ~~stand~~ up on hind legs (9:35). 9:40 low sun cast but bright. ♂ of 6, came up, walked toward 2 ♀♀ from rear, & they, came down + back, walked to 5 yds. away. By 10 a.m., ^{one ♀} ~~one~~ had been prone 10 min.; another 5 min.; all ♀♀ walked up slope; all d. + u. ♂, 100'

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from others, walked up too + ♀♀ toward him + to top of ridge. Atop ridge ♂ d. + w. 10:10, ♂A + 2 juv. ran S. fast at fork of E. 139 Draw; then the ♂ ad. ran fast ^{to} 5, 100 yds. farther E.; then black long haired dog appeared 300 yds. behind but stopped + finally ran back N. 10:20, the group in E. 138.2 Draw now 3 yrl., pregn. ad. ♀, ♂. On green flat 200 yds. SE of Stream. ♂ of 5 stood + came ^{50 yds.} toward ad. + 3 yrl. which appeared 400 yds. from him, 50 yds. NW of 138.3. Some yrl. of 5 held tails up + looked too. ♂ 50 yds. more toward road; then looked N. as 2 Indian boys with dog came around ^W base of Rocky Hill. ♂ of 5 gave descending ^{whistling} whistle. The others in group joined ♂. They stood while 2 boys with dog on leash walked up opposite side of draw 200 yds. from them. 10:43, the 5 walked to E. 138 Flat. The boys walked SW to SE of SW Branch; ^{possibly} probably after baby vicuñas. The ♂ + 3 yrl. grazed in W. 138 Draw. I ^{drove} down to 137.6. ♂ + 2 yrl. 100 yds. across Stream. A group of 5 including 1 yrl. + ♀♀ was walking N. up rocky slope near them. The boys + dog passed passed 1/2 mile E. of the 3; ♂ watched + walked 100 yds. toward them. 11 a.m., 2 ad. + yrl. (look as high as lateral line on side of adult) ascended slope NW of 137.4. An adult from 50 yds. SE of 137.2 ran up slope to 50 yds. from them + stood atop a boulder, staring at the 3. The yrl. nursed at l. side mother for about 1 min.; then the 3 walked on over hill; lower one grazed there. 11:23, ♂ of 142Y ^(the 5 run 9 lines above) ran, tail up, 100 yds. up draw + stopped. 4A1Y came down draw + ran S.; another ♂ chased them (at 50-100 yds. dist. behind) almost to crest of hill S. of E. 137.5 Draw, 500 yds. E. of Stream. ♂ of the 5 came 50 yds. back toward chaser, latter standing on a rock looking back toward mother, but when chaser turned the other ran back to its group. 11:55, drove down road from 137

Arg - sta Cruz - red.
29-251 E, 1 km.

2 km - E - Volante
GAC - yell + maroon
46-477

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& found ad. & yrl. prone by road at 137.4 (♂ + ♀?). 200 yds. S. of
 133, 10 ad. ^{1 yrl.} with 1 juv. (rods. there last 2 days). Two at NW side
 of S. 133 Flat, 300 yds. from ^{the 11 (+ juv.)} at 12:20, juv. was prone 10 yds.
 from nearest ad. The yearling still in this group - first group seen
 with yearling & juv. 12:23, juv. up, stretched (hind feet planted; legs
 forward), ran quickly to mother. Top head juv., standing, level with
 top mother's back. ^{12:25 - juv. possibly nursed.} 12:27, juv. prone 5' from grazing mother. No chemi-
 ness; prob. over a day old. 12:31, juv. on side, head up. One ad. prone 12:35.
 Juv. eyes half closed; head down on ground 12:50 (body on side).
 12:53, mild alarm; juv. up & by mother; ♂ runs 50 yds. + stances - toward
 truck stopped at 132.8, some of men out nearby. Mother & juv. stay 100' from
 other ♀♀. Group walks 50 yds. W. 1 p.m., mother & juv. walk quickly to
 group. Juv. 10' ahead; raises tail high or mother catches up. 1:02,
 juv. nurses at L. side mother (she stands, head up, ears back). 1:06,
 group walks E. Juv. by mother's side, tail up; juv. ^{stops} ~~spits~~, sprays
 hind legs (not on feces pile). Mother looks, then walks on; juv.
 runs to catch up. Juv. still ^{carries} ~~carries~~ tail holds tail out, (P or N)
 when walking. 1:10, group spread 100 yds. but stopped; mother & juv. go
 to head of group (300 yds. S. of 133.2). 1 ad. lay prone; up 3 min. later.
 1:13, mother & juv. down alongside. Juv. rolled. 1:28, juv. + mother up;
 juv. nurses at L. side facing [♂] ~~♀~~; the norm. 26 min. since previous
 feed. Suckles 2 min. 10 sec. Then lies prone 1/2 min. later (1:31), but up
 again & running about. Group moved 50 yds. W. Juv. lay down by
 grazing mother (1:37), ^{lies} ~~lay~~ up at 1:41; down 1/2 min. later; 5 m side,
 head up. 1:43, an adult on side 10' from juv. 1:48, ad. up to prone.
 1:50, juv. lays head & neck on ground, on side; 1:55, head & neck ^{up} ~~up~~.
 Ad. rises, grazes. 2 p.m., juv. up. 2:05, juv. nurses at L. side

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mother for 1st min. 2:08, juv. lying down. Feeds about every 1/2 hr.
 2:20, juv. head down. Light hail. 4 ads. prone. Juv. up & prone
 across rear of one. Hail from E.; tails to E. 7 ad. down by
 2:25. 2:28, only 1 still grazes. 2 grass walk thru the prone group.
 Hail gradually stops. The ad. directly ^{2:38} downwind of juv. rises & grazes.
 Then all prone; ^{seems to be} juv. ^{or next to} in front of one, its neck over, adults (too yds;
 can't see well). 2:45, this adult up & grazing (mother needs more food
 than others?). Another up 3 min. later. Snow & rain. One ad. with
 chin on ground for several minutes. 2:55, faint rain; 3 more rose;
 3:00, only 4 ad. + juv. still down, nearest 10' from juv. 3 p.m., only 1 ad. +
 juv. still down. 3:03, only juv. (4 at 3:12). I walked to top of
 N. 133 Ridge & saw the 12 ad. + 1 juv., half of them across on
 N. side of the ^{stream of} loop. ~~too~~ Drove up road. 133.9, the ad. ^{3:30} (07)
 & yrling (prob. ♀). 135.4, 8, ⁰⁷ only 1 or 2 over 2 yrs. old, 50
 yds. SE of road. W. wind, overcast. I returned to camp.


February 22, 1952 at 7:30 a.m. drove up road from 137. The

usual 7 100 yds. NW of 137.9. ♂ + 3 yrl. at 138. The 6 ad. ^{in E.} in
 139 Draw. The 8 ad. + 1 juv. in W. 139.3 Draw; descended to foot &
 worked downstream (O.P. took manure). Juvenile ^{named} fed at L. side
 mother at 8:17. ^{Earlier} Earlier ran up to 50' from mother, jumped
 up into air. Group down to road at 139.2. ♂ of 6 came to
 road at 139.1. The 9 retired up W. 139.3 Draw, mother & juv. leading
 by 50-100'. 8:45, lone lone short L. ended ♂ on ^{flat} across stream from
 138.3. 4 in the E. 138.2 Draw group. 9:15, 11 ad. + 1 juv. 400 yds. S.
 of 133; 2 at SW foot of S. 133 Flat. The 12 ad. + juv. in loop of stream
 200 yds. N. of N. 133 Ridge. Ad. ♂ + yrl. on S. slope of N. 133
 Ridge N. of 133.2. 11/12:30, drove up road from camp (137). ♂ + 3 yrl.

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50 yds. SE of 138.1. C ad. on N. side of E. 139 D row. watched them 1 p.m. - (12:45, ad. ♂ + yrling - near stream at mouth E. 138.4 D row). 1:25, 4 of C down on sides in grass after rolling; up 2 min. later. Still together in bottom E. 139 D row 1:45. Moved to 138.3. SLE ♂ 100' across stream. ♂ + 3 yrl. just N. of mouth E. 138.2 tributary. 4 on flat of ^{upper} E. 138.2 D row. ♂ of these came 200 yds. downstream to 50 yds. from the ♂ + 3 yrl. (2:04). The 4 slowly retreated ~~low~~ across stream toward road. The other ♂ ran back up canyon & chased one yrling 10 yds. Then these 4 grazed together. 2:25, pregn. ♀ of E. 138.2 group (of 4) kept tail out  - 10+ minutes (down 2:30). 3 p.m., ♂ from up E. 138.2 D row ran to 50 yds. from low (SLE) ♂; ~~stopped~~ ^{looked} to piles & d. + m. Then ♂ of 4 ran to mouth of E. 138.2 D row where the ♂ + 3 yrl. had again come to opp. side. Latter 4 walked back to near road. The SLE ♂ chased a young ♂ ♂ N. from mouth E. 138.4; then grazed at N. edge mouth. ad. (with 3 yrl.) crossed to NW side road at 138.25. 3:15, ♂ of E. 138.2 group walked up to edge E. 138 F lat. 3:30, moved up to 139.3. 8 ad. + 1 juv. at foot E. 139.4 D row. juv. works jaws open & closed, mouth to ground, & again when head up; working rather hard at this. juv. nursed at R. side ad. at 3:43; nursed 1 min. 5 sec. 3:54 juv. with hind legs spread at feces pile; urinated; maintained stance 3 min. but no feces. 3:57, juv. lay prone. Both ankles bent ~~at~~ strongly before one down so unsteadily in assuming position. 4:15, hard hail started & all 9 soon prone. One juv. tried to lie by adult ♀ not mother, & ad. chased it away by turning head quickly toward it, twice. Then mother, 2 or 3 meters away, up & to rear of this other ad. which rose, & mother down in its place. Eventually one juv. down prone crosswise to a pair mother & behind, &

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 other prone beside a 2' high rock (some shelter) about 8'
 from mother. Some shake heads in hail. Group came much
 closer together, $\approx 50'$ from others. The 6 in B.B. Draw also
 prone in hail & in one bunch.

February 24, 1952 8:30-9 a.m., drove up road from
 137-139.5. The 5A24 at edge S. 133 Flat opposite
 km. 138, \approx of the E. 138.2 Draw & chasing them
 mildly (its group on same flat). 5A + 1 juv. on flat of
 head E. 138.2 Draw. Ad. + ^{juv.} 200 yds. up E. 138.4
 Draw; 5LE \approx near stream at mouth of this draw.
 \approx + 3 yrl. at 138.1. The 6A near Broken Bridge with
 1 juv., fur still somewhat messy, born since day be-
 fore yesterday evening (prob. Feb. 23). At foot of W.
 139.3 Draw, 6A with no juv. (6A + 1 juv. before). Drove
 on up road & returned $\frac{1}{2}$ hr. later. None seen 139 to
 137 (dog probably - one seen on road). Drove to
 133. 11 ad. + 1 juv. at S. edge of S. 133 Flat. Ascended
 N. 133 Ridge & saw 12 ad. + 1 juv., 9 ad. ^{being} across on N.
 side of stream on N. leg of loop. At 12 drove 137-
 139 & back & saw no vicuñas from road.

February 25, 1952 7:10, drove up road from 137. The 7, 50
 yds. NW of 137.8, have only 1 yearling now (\approx gone?). The group
 at foot of W. 139.3 Draw has 7 ad. + 1 juv. (loss of 1 ad. ♀). Cross
 Cirrus clouds, 8/10, + $\frac{2}{10}$ alto cum. (7:30). I watched the 7 + 1
 (7:30 a.m.). \approx ran 50 yds. upstream when a vicuña
 appeared on road at 139.5 (latter retreated & \approx back to group).
 Juv. seems to feed on forage but not diligently like adults. 7:40,
 8:40

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ad. ♂ d. + w. on pile 50 yds. from ♀♀. Neck glands (dollar sized concavities in wool) ^{prominent} ~~prominent~~ in ♂. 7:43 juv. prone 5' from ad. 7:47, juv. lying on side, head & neck on ground. ad. ♂ has pale lateral stripe both sides. ♂ rolled, then lay prone 5 yds. from juv. Juv. up. ♂ up & put nose close to side juv. Juv. showed no alarm. ♂ then grazed. Juv. prone again 7:57. Then on side in sunshine. 8:07, ad. ♀ 100' from other d. + w. on pile; moved pile but did not feed; urinated at same time defec., & continued long after. 8:07, juv. up & followed mother. 8:10, juv. tried to nurse; mother muzzled flank near tail. Tail juv. up. Then broke off but tried again 1/2 min. later & nursed 1 1/4 min. standing at R. side. Stopped sun accord. Prone by 8:14. Up in 2 min. & to feces pile where ad. ♀ d. + w. Juv. moved pile, spread hind legs, urinated (♂) in high crouch. 1 min. later returned for shorter period; 2 pellets seemed to drop from anus. 3 ad. ♀♀ prone, in sunshine, by 8:18. Face across or down slope. Juv. muzzles near bunch grass, then stands & chews. Loose skin of posterior medial abdomen mother hangs slightly below horizontal. 8:25, juv. prone; up in 2 min. 2 ad. still prone 8:25. 8:28, juv. prone 10' from nearest ad. Up quickly on pregn. ♀ walked close to it. ♂ ran 80 yds. upstream & urinated feces pile. Last prone ♀ up. ♀♀ grazed & worked toward ♂. 8:35, juv. to R. side mother (grazing) & received gentle kick with hines, then walked away to edge stream (50'), ran back to mother, put chin up on post. back of mother. Juv. made 2 more trips to 50' from mother & ran back. Mother rolled on grass, rose, shook body. Entire group in 30' diam., now 50' W. of stream opposite 138.4 (8:40 a.m.). 8:45, ^{juv.} ~~juv.~~ prone among feeding adults. 8:50, one pregn. ad. holds

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tail 3" out from body. Anal area protrudes like a sea-anemone. Another does this to lesser extent. 8:55, juv. doger, ears 45° up, neck curved slightly back, eyes half closed. 9:05, ♂ ran 80 yds. toward ad. approaching (tail up, slow run) across W. 139.3 Draw. This one passed ♂ & latter pursued 10 yds. behind but stopped short near edge of group. Other stopped & grazed 5 yds. from a pregn. ♀ of group. ♂ grazed. New one ♀, & apparently. 9:10, juv. prone as before, head up (1 hr. since nursed). Juv. sometimes chews for several seconds. The new one stays as one of the group (former ♂ ad.?). 9:25, grazing & working downstream. Juv. still prone, 150' from nearest ad. One ad. ♀ lies prone & chews cud. 9:29, juv. eye & to mother. Mother, juv. beside, then led group in slow walk up slope to W. Mother d. & w. 10 sec. on one pile, longer on another. About 4 ♀♀ followed & d. & w. on first pile. The juv. kept hind legs spread, tail up, for 40 sec. on another pile. Group over top of hill, ¹⁰⁰ yds. from starting point, by 9:40. Descended rocky hill E. of 139.3. 100 yds. across canyon (almost hidden - squashed in different bunch) are squashed at me, & the ♂ + juv. started away, mother & juv. leading, & went on to a ridge 1/2 mile W. of ^{139.3} ~~139.3~~. On slope to S. of E. 139 Draw, 8 ad. + 2 juv. (the 7 + 2?). Vicuña wary of man walking in hills; some squashed at me 500 yds. or more away. || I drove to 138.4. Ad. + yrl. prone in bottom of E. 138.4 Draw, 100 yds. from stream. The lone SLE ♂ 100 yds. NW of 138.3, standing atop rock outcrop. On S. slopes of E. 138.2 Draw, ♂ + 2 (1 or both yearlings). 10:30, the SLE ♂ prone on rock, chewing cud. The pair in E. 138.4 Draw walked quickly up draw, ♂ leading (OC); & up the S. branch. 10:35, ♂ of 3 walked to edge of S. 138 Flat. I moved to 138 where

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 the CAIY were by stream (where ^{Huaylarco 15000; Dpto. Arequipa} ~~where~~ watched during hail a few days ago).
 One prone; one on bunch grass spit in water; others on SE bank. 10:50,
 all walk into stream. Most d. + u. there. The yearling a ♂. ^{ad.} ~~Ad.~~
 stood in 6" water + grazed at grass-clump islands. ♂ out
 on SE side + d. + u. on feces pile (tail pulsed 24x in 10 sec.; urine
 stream at about same rate). 11 a.m., some in water above suble
 depth in feeding on islands of grass. 11:03, all out of stream + up
 slope + ^{passed or at} 5 yds. ~~past~~ male distance; grazed 100' from stream. 11:08,
 the E. 138.2 D row group of 3 were at SW corner of S. 133 D Flat.
 ♂ walked toward the 3. at 100 yds. distance the 3 walked away slow-
 ly for 50 yds. + down to stream again. ♂ of 3 stayed halfway
 up bank, 50 yds. from its group (away from the 3). 11:33, ♂ of 7
 ran along top of bank to 5 yds. from the 3 + stood sideways to
 them, then ran 10 yds. downhill + stood. The 3 looked at him, then
 walked away toward S. 138 Flat in grazing. The 7 ♂ + the 3 grazed ^{par-}
 ally 20 yds. apart (11:37). 9 ♂ went 50 yds. to a feces pile; d. + u.
 5 sec.; tail up ran back to the 3, to 5 yds. from them, + the
 3 slowly walked away. This was 50 yds. SE of stream. 7 ♂ then
 returned to 11:33 position + grazed. // Yesterday saw badly limping
 ad. ♂ in band of all ♂ or ♂. Wounded ♂ or ♂ apparently cannot
 hold ♀ + territory. // At least 1 yling. of 3 is ♀. 11:55, the group of
 7 (minus ♂) looked hard at 2 running up N side of E. 138.2 Draw,
 then walked 100' ~~to~~ NW of stream. ♂ followed at 12:00. No alarm
 or hurry. One scratched melanosoma with lower incisors. 12:07,
 the 3 came toward 7 + descended to NW side of stream. at this,
 ♂ of 7 descended to stream + herded them back, then chased
 a yearling of 3 100 yds. on S. 133 Flat (3 ♂ followed but not

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beligerent). ♂ of 7 then grazed across stream from its head. Yrl. of 7 (♂) d. + u. on pile. 12:12, ♂ of 7 crossed stream toward its group. 12:15, the 7 crossed to NW side road, group at 138 + ♂ at 137.9. 2:10, drove up road from 137. Across stream from 138.7, juv. with 3 ad., heading for E. 138.4 Draw. Two or 3 others following same route; one a short L. eared adult. At least 6 ad. + 2 juv. at top ridge S. of mouth of E. 139 Draw, walking W. across stream from 139.2, ^{south} a group of ♂, pregn. ♀, + 2 yrlings, + another 2, (♂ + ♀(?)). A lone ♂ came across road at 139.14 on up N. side of E. 139 Draw. The 2 ♂♂ looked + we held tail up, but no chase. The 2 + 4 grazed within 20 yds. of each other (displaced from territories?). The group with 2 juv. to S. fork of E. 139 Draw. Then a big ♂ (of this prob.) chased an adult back & forth in that vicinity, pursuing or giving loose grating cries (2:50). The 2 + 4 walked to Broken Bridge Draw. One ♂ hit flank of its ♀ + latter kicked back with 1 foot. ♂ of 4 ran ^{a few} yds. toward the 2, then retreated. The 4 + 2 sometimes only 10 yds. apart. 2:55, the group with 2 juv. in N. fork of E. 139 Draw. Only 4 ad. including ♂ seen. In a squabble near 1 juv., ad. ♂ + an ad. ♀ reared & charged each other. Then mother moved juv. & walked with it. Then went S. to head S. fork of E. 139 Draw. Mother's lead, ♂ in rear. ♂ turned & drove back another which tried to follow. 3:05, ♂ ran back back 100 yds. & drove back the one (it appeared to be ad. ♂). The lone one ran after group & into it, again chased closely by ♂ of group. (The 4 + 2 went N. out of B. B. Draw). I drove down road. 3:30, across stream from 135.6, ♂, 5 ♀♀, 1 juv. Juv. prob. under 1 day old. Dry,

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but piece of dry membrane clinging to rump, + unsteady in standing + walking. Walks with hind legs spread. Juv. prone 3:33. Juv. lay on side + thrashed. Juv. unsteady prone as if hind feet too big to fit under body. Ears up vertically. One ad. ♀ very turgid, tail held out + black skin around anus bulging double-fist size. Mother nuzzles head + side juv. occasionally (3:40). 6/10 cumulated; curium + ci. - str. above. Juv. dozes; head + neck to ground 3:45, + body half on side. Mother up to 5 yds. away; touches juv. with nose every few min. 3:53, juv. up + nursing. Stands at rt. L is to mother on R. side, neck turned left + head vertically up. Mother grazes so juv. must sidestep + occasionally contact lost. Juv. keeps this up for 4 minutes. Tries again but out in 10 sec. Mother d. + u. on pile; juv. sucks at same time but mother moves juv. flank + it away. Juv. runs up to 10 yds. from mother. ♂ has been grazing on flat next to stream while others graze 50-100 yds. away up gentle slope. By 4:10, juv. prone twice for 1-2 min.; then again prone. Head down, then prone; all the way down with one metatarsus still vertical (^{gossamer} ~~lying~~ prone ^{position} not entirely innate at birth). Up; down + up by 4:13. Juv. to a pregnant ♀ + tried to put head under belly; the ♀ walked away. Juv. tried again + again, its mother following ♂ behind. Finally by mother. On L. side mother walked under chest, then backed up + put head between mother's forelegs as if to suck there. Then out + at L. side mother + ^{9:15} nursed, mother standing still, for 2 3/4 minutes, stopping by self. Only 22 min. since previous meal. Juv. prone on bare ground of slope at 4:19. 4:24, head of juv. on ground; eyes nearly closed. 4:26, head + neck up

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when mother raised head. 4:28, head again down. Head up 4:31 after visit from mother. Rode forward until nose at ground; then up, eyes nearly closed. Down 4:32. ♂ grazes 100 yds. upstream, along base of Festuca hill, from ♀♀. 4:34, head juv. up as mother rubs its head on juv. neck. Mother accidentally hits juv. in head in walking away. Juv. nods to ground & ^{brings} head up quickly when nose hits. 4:36, juv. up & walking near mother across Festuca slope. Mother stops when ^{nearer} than other ♀♀. Then juv. clumsily prone, thrashes on side, up again. Again prone, falling to both wrists at once; up again. Lefts legs high in walking among sticky Festuca clumps. Mother grazes on short stuff between clumps. Once pulled something from Pycnophyllum mat (higher grass prob.). 4:43, juv. prone between clumps & up again. Noses mother's side. Keeps head under mother's abd. 5 sec. Mother walks & juv. stays within 5-10'. 4:46, juv. prone & up. Juv. nose to nose with pregn. ♀, then follows 10' trying to put head under abd. as ♀ walks away. 4:50, juv. prone 10' from mother, head on ground. Up 5:02. Mother drops long stalk, doubtless of Festuca, from mouth (must eat some). 4:54, juv. prone 10' from mother; up & nuzzles tail of mother. 5:05, prone 5' from mother on bare spot. 4:57, juv. up. Nurses at R. side mother. Mother puts own muzzle under her abd. for 5 sec. Then she stands still, not grazing. Nurses 1 min. 40 sec. Then walks under her abdomen, rubs heads with mother & lies prone by her side. Up & down again 1 min. later. Juv. eyes nearly shut. 5:06, a pregn. ♀ prone. 5:08, mother prone 10' from juv. but up 1 min. later. 5:12, juv. lay head on ground. Juv. & mother now farthest of group from ♂ (150 yds. ^{to} NE). 5:15, mother rubbed head on juv.; juv. head up; mother pushed juv. head down with her chin. Juv. remained prone, head up. 5:17, juv. up.



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5:19, another

~~4:53~~ ad. prone; up in 2 min. Mother & juv. walk across slope toward slope above or. juv. runs up to 10 yds. from mother & back. Prone ♀ has tail a little out even in this position. 5:27, it rose. Scratched hind foot with tooth. Shook head. Nibbled flank. Scratched head with hind foot. Shook body. Grayed. Walked 10'. Nosed ground. Walked feet up & down. Def. & ur. Grayed. 5:29, juv. prone 5' from mother, halfway up Festuca slope.



February 26, 1952. 6:55, drove up road from km. 137.

Ad. + 3 juv. at 138.2. 4 on flat of upper E. 138.2 Draw. Two in E. 138.4 Draw. 1 ad. + 2 juv. in upper E. 139 Draw, a 2nd ad., tail up, near them (same one as yesterday?). At 139.15, at road, 6 ad. + 2 juv. (1 on Feb. 24 a.m.). Both juv. walk & run well (second probably born Feb. 25 or afternoon of Feb. 24). 50 yds. up slope W. of 139.2, 9 ad. + 1 juv. (gain of 1 more ad. since yesterday). Ciro stratus overcast. No rain since evening of Feb. 24. The 6 + 2 juv. retired across stream to S.E. side near Broken Bridge. An adult squealed as 2 cars came down road. I watched the 6 + 2 juv. (7:30). Both juv. prone by mothers (grazing). This is second group with 2 juv. Another pregn. ad. has tail out & anal area protruded . 7:38, juv. A puts head on ground & lies 1/3 on one side (younger?); juv. B. keeps head & neck up, eyes half closed. 7:42, spitting heard at 100 yds; the 2 mothers spitting, 5' apart. B mother nosed juv. A, which quickly rose, then walked to own juv., which rose. Both juv. nuzzled. B. mother grazed & stopped nursing 7:44. A continued a min. more. Both in nosed flank juv. Mother A walked, breaking contact. Lips of mother A agape (from spitting?). Juv. A slightly unsteady when nibbles mother's corpus or scratches head with hind foot. Juv. A prone 7:47, + B

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shortly before. Mother lay prone 10' from juv. A. 7:52, juv. B walked to
 6' from mother A; latter blew at it & flipped tail up & juv. retired a
 few feet. Juv. B prone 8' from juv. A, its mother prone 3' beyond, & on-
 other ad. ♀ 6' behind mother. Prone ad. ♀♀ chew cud; juv. dogs, heads &
 necks up. Diffused sunshine. Juv. A, thinner necked & drawier, lay
 head on ground 7:59. Both mothers & juv. A up 8 a.m. Juv. A nursed at
 L. side mother, 1 $\frac{3}{4}$ min.; mother grazed then & moved away. 8:03, juv. B lay
 head on ground. 8:04, mother nosed juv. B, then struck its side with
 forefoot. Juv. B up, tail up, & tried to nurse (only 3 sec.). Juv. approach-
 ed rear of prone pregn. ♀ & was ^{labeled} ~~sp~~ at. Juv. A & B came caut-
 iously to each other. ^A Mother moved side of its juv. & juv. then fol-
 lowed mother. Tips ears of juv. ^B A curved ~~at tip~~. 8:10, juv. AB
 nurses, R. side, 70 sec., when mother moves off. Juv. A prone (^A Basal-
 in). Basal $\frac{1}{2}$ of tail juv. ^B A twice as thick as distal . 8:12,
 juv. ^A B lies on side, neck & head on ground; head up but occasionally
 falling back til ears touch side (8:17), then down on ground;
 again head up & sniffs to ground (8:20). Both juv. up 8:22 & prone
 again by 8:23, 50' apart. Head juv. A drifts back til ears touch back,
 then head falls to ground. Lies on side; juv. B prone. B further from
 adults (to 20 yds.). 8:30, mother to juv. B, noses side; it up, tail up,
 tries to nurse 10 sec.; mother puts muzzle under belly juv. Juv.
 prone again. Smaller tail tip perhaps due to holding distal $\frac{1}{2}$ tail
 between heels in prone posit (there at birth?). Younger juv.
 feeds more, lies down more, drawier more, wobblier on legs. By 8:37,
 juv. B on side, head & neck up. 8:44, mother to juv. A & nosed it. It up,
 tail up , & nursed (tail down) at L. side for 2 min.. Mother to juv.
 B & it rose, then prone again. Mother A nosed tail of nursing juv. Juv.

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Arrived to mother B. Latter thrust its muzzle to juv. face (as if to bite?) & juv. retreated to near own mother. Tail half out, ♂ now faces pile where ♀♀ had d. + u.; then ♂ d. + u. 5 sec. & walked away.

Juv. A does not have recurved scutellum or smaller distal tail. It scratched with + cre. with lower incisors. Juv. A prone 8:53; 50 yds. from B.

Juvs. doze, heads falling back slowly. 9 a.m., at least 5 of 9 ad. of E. + W. 139.3 group ^{juv. waded} bathing in stream. 9:05, juv. B nursed, then lay prone again. Mother + juv. A rubbing noses, tongues making in & out, juv. sometimes biting mother's nose. ♂ of 6 ad. ran across road at 139.1 to W. 139 Draw. 9:19, ♂ returned to head of 6 ad.

Juvs. still down, A flat on side, neck + head down; B on side, head up. Mother A prone 5 yds. from juv. Mother B grazes 20 yds. from her juv. 9:25, 7, wet, led by ad. ♂, ran S. atop ridge E. of 139.2. ♂ of 6 ad. ran toward them. Mothers + juv. walked quickly toward stream. The 6 ad. + 2 juv. finally ran across road & up W. 139 Draw. 8 ad. + 2 juv. from up E. 139 Draw ran toward E. 138.4 Draw atop ridge E. of 138.8. The 7 followed same route. The # W. 139.3 group ran to W. Probably a dog. I drove up road.

2 Indians with dog on back 100 yds. E. of him. 140. Groups in B.B. area could not have seen. They said they were looking for sheep. I drove down road. Ad. + 3 ^{juv.} at stream at 138.6.

Then looked upstream & dashed up hill when Indian walked at head of B.B. Draw (.6 Km. distant). 4 at head of E. 138.2

Draw took alarm & ran SW at 10:10 The ad. + 3 juv., 50 yds. SE of 138.3, took no alarm. 10 a.m., ad. & juv. at mouth E. 138.4

Draw on NW bank of stream, feeding at thick green tufts. 10:20 the E. 138.2 Draw & ^{on} at ridge S. of E. 138 Flat, it appears. The 7,

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no juv., on higher green bowl 300 yds. W. of 137.7. 10:25, 3 ad. (2 ♀, pregn.) 50 yds. NW of 137.3. 5 ad., incl. pregn. ♀♀, in E. 137 Draw. 10:30, about 25 ♂♂ in N. 136.7 Draw. 10:40, 6 ad. + 1 juv. in mouth of S. 135.5 Draw. One ♀ very turgid. Juv. has lost membrane on back. 10:45, at foot of hills 100 yds. N. of 134.8, 9 ad. (no juv. yet). 10:55, 12 ♀♀ (incl. 1 yrling) + 1 juv., ♂ returning from meeting with ♂ across road, ^{200 yds. S. of} 133.15 (edge of green S. 133 Flat). The ♂ to N. has 2 yearlings now. These grazed on S. side of N. 133 Ridge N. of 133.1. 7, ^{all 1 or 2} mostly 1 + 2 yr. olds, prob. all ♂♂, 50 yds. S. of 132.9. These chased across road (11 a.m.) by a lone ♂ ad., wet on lower parts (of 2 on S. 133 Flat?). The ad. ♂ ran back S. across sandy low hill. From atop N. 133 Ridge, 11:10 a.m., saw 12 ad. + 1 juv. at edge of stream, at N. corner of the loop flat (600 yds. N. of 133). One turgid ♀ with tail slightly out. About 200 yds. up E. N. 133 Canyon from N. leg of loop, 6 adults. 11:35, several of the 14 on S. 133 Flat bathing in slow moving stream 100 yds. S. of 133. 11 at once in the water. One prone, water halfway to back, 30+ sec. (pregn. ♀). Juv. too lay prone in water, then ran out. Bathing of the 14 over by 11:43. ♂ of 2 (100 yds. S. of 132.8 on sandy slope) came to 20 yds. from the 14. Stream, or line near it, separates the 2 + 14. Juv. raised bare tail of prone pregn. ♀; ♀ turned head + blew at juv.; repeated; then up & walked away. One of 14 crossed creek & stood ^{tail up} 20' from ♂ of 2. ♂ of 14 across, drove over one back, & ran a few yds. at 2 ♂. 11:48, more bathing 100 yds. farther upstream. Water halfway up metatarsus. Earlier wading seen in water nearly to chest + elbow. No general lying down after bath but 2 prone 11:51. One prone in water 20 sec.; another 47 sec.


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Calm, bright, diffused sun. Doubtless warm sunny weather stimulates bathing (or opposite inhibits). 11:55, none prone or bathing. ♂ of 2 remains 10 yds. across (NW side) creek from the 14. I drove back up road. The 8 m. 135 + 6 near 135.5 as before. 6, including 2 juvs. + pregn. ♀♀, at stream at 136.2 (?). // Mary watched 4-5 p.m.

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1/2 cirio-stroter; sunny; frosty night. 7:50, I drove up road from km. 137. The 7 (5 prone in sunshine) 20 yds. N. of km. 137.8. ♂ + 3 juv. 50' S of road at 138.25. These stay at 50 yds. distance when car stops on road opposite them. 6, apparently ♂, across stream from 138.7. Love or, cars entire, 50 yds. W. of 138.8. The group in upper E. 139 Draw, near fork, has 9 adults + 2 juv. The 6 ad. + 2 juv., 50 yds. SE of Broken Bridge. One juv. nursing at 8:07. None in part of W. 139.3 Draw visible from road. I parked (8:15) near Broken Bridge. Both juv. prone, 10' apart, nearest adult 10 yds. away, at 8:15. Both have depression at mid tail; apparently caused by heels holding tail when prone. One (B) with ear tips recurved. Face of A somewhat messy, as if wool not quite clean, in A. Both heads up, eyes half closed, R. sides to sun, 100' from stream. 6 ad. nearer to stream. 8:25, ♂ d. + w. 5 sec. Earlier I saw that the 2 juvs of 9 + 2 j. in E. 139 Draw were about 5 yds. apart; adults farther away. 8:29, ad. ♀, forefoot in stream, urinates, tail . Eyes juv. A bright-vental black slit; fully closed? 8:37, juv. B lay on L. side, stretched legs slowly & stiffly down. 8:38, adults look up + one ran 5 yds. juvs. up. Juv. A nursed at L. side 1 1/2 min., then mother grazed & walked away. Eye open + ears back parallel to neck in nursing. Tail ^{constant} motion of juvs. definitely a crease, not short hair. Juv. B tried to nurse

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but no luck. Juvs. stayed up. 8:45, B at edge stream as if urinating in water. Ad. ♀ puts muzzle under its rear for 2 sec. & juv. walks a step away. Mouth of juv. B works on lips move over short fringe. An adult lies on side; respiration 15/minute. 8:51, juv. A prone. B to it & A stands. B walks on. A prone 8:54; B 1/2 min. later, 20' beyond (from ♀♀) A. B jumped up as a small bird flew 10' from it. 8:56, A up & trying to nurse. B ran to mother and nursed but seemed to change nipples every several seconds as if getting little. About 1 1/2 min. mouth at ♀ belly. ♀ grazed & walked. Kicked head juv. with knee when tried to nurse. Juv. A prone by 8:59. B to A 9 a.m. & latter up; B walked on & A prone. Concealment of juvs. good when prone among boulders. 9:01, juv. B prone 5 yds. beyond A. 9:08, B on L. side, head up. One ad. prone on ^{grassy} mound 9-9:10. 9:11, both juv. up. About 12 ♂♂ on hill 100 yds. W. of 139, being driven downhill by an ad. ♂. ♂ of 6+2 ran to help. Juv. A nursed at R. side of mother as she stood, hind legs spread, at feces pile. One ad. ♂ stood atop a ♂ boulder 4' high, 10 yds. from the yng. ♂ group (apparently 3 ad. in group ~~prob. the ♂ of the 6 ad.~~ of which ♂ of 6 ended up near mouth E. 139 tributary, chasing the young ♂♂). 9:18 juv. A prone among rocks. 9:20, juv. B prone 10 yds. from A. 9:22, both juv. up & to mother. Juv. A tried to nurse but mother drew knee up on that side. Juv. B went to 3' from mother A; latter thrust head out & blew at juv. B. Group walked downstream toward their ♂. 11 I moved up road & watched 9 ad. & 1 juv. at stream opposite hm. 139.5. There had come down draw W. of there (9:30). Juv. runs around among adults; turning sharply, jumping up, rearing. Adults pay no attention. Juv. jumps up & puts chin over back of mother & she walks away. One ad. bathed in stream. Group moves down-

action 2 juvs. for 1 hr.

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stream. 9:45, ♂ goes 100' ahead; visits 2 feces piles in succession & uses both a few sec. Grazes 3" narrow green spera blades from one pile. 9:50, mother prone. Juv. gambols beside. Rubs against mother, straddles back with forelegs, jumps up like bucking horse, rolls by her side, runs 50' away & back. Mother up 9:52 & moves downstream toward others. Juv. runs about, tail up, always returning to mother. 9:56, juv. prone. 10:00 am, 2 ad. on side in sun. ♀ has thin black mid-ventral line ending where short hair ends, in rounded spot — at umbilicus? ^{post. to} at tip sternum, Grazes more the work rapidly; partly cutting grass but also chewing rapidly before next bite. One ad. up; another rolls (10:05). One on side, head on side on ground, chews cud. A pregn. ♀ licks. One wrist down, then other, then bends hind legs & as down dips arch of neck & rises immediately. One on side scratches belly 5 quick scratches with bared lower incisors. 10:08, largest down ad. up; One still on side. 10:11, 3 down of ad. ♀♀, & juv. still. Calm, warm, sunny. 10:14, 5 ad. down, one on side with head & neck on ground. 10:17, juv. up. Has crease in fur distal 1/3 of tail. 10:20, juv. nurses at R. side mother for 1+ min. 10:28, all up but another ad. ♀ prone. 10:43, juv. prone. Ad. lay prone 50' from it. Juv. to ad. & lay prone close against L. side, on sandy flat ground, 50 yds. from nearest other of group. Thus to 11:05, quiet; then juv. lay on its side, ventral side toward, on L. side adult, nearly touching ad.; ad. stayed prone, head up. 5 ads. prone 11:06. 11:07, juv. prone, head up; ad. head on chin in front of body. Another ad. in similar posit., chin on ground ^{only} anterior to angle of jaw, eyes half closed. 11:10, 6 ad. prone; sunshine, fair breeze. 11:12, ad. mother head up, prone; juv. beside lying on L. side, head on side on ground. Juv. respiration rate 30/40 sec. all 6 prone ♀♀ on gravelly or sandy flat ground 20-50' NW. of stream; ♂ & 2 ad. ♀♀ graze

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on gravelly flat where much stunted thorn brush on E. side of stream at 100'; adults alert at sound of speed-graphic shutter - raise head but no steps. 11:20, juv. head + neck up but dozing, head gradually falling back. Only 4 ad. still down. A pregn. ad. flat on side, chewing and tho head on side on ground; tail out from body Π . Then σ^7 + another ad on side too. σ^7 testes protrude behind appressed thighs. σ^7 respir. rate 15/minute. Has dark umbilical spot about 8" anterior to penis. 11:26, only 1 ad. ^{of gray} up; 3 of those down flat on side. 11:30, without any alarm cry all up + ran 200 yds. to 50 yds. up rocky hill-side W. of 139.25. σ^7 chased 2 others which ran across above them. In next 10 min. no further alarm; several rolled + 3 or 4 remained lying down on the slope (scattered boulders). Drove down road. About 10 young σ^7 + σ^7 in W. 138.6 D raw being chased by ad. σ^7 . σ^7 + 3 juv. yearlings at road at 138; ran only 100' from road when I stopped there. The 7 at road at 137.8, 2 prone atop dirt pile. σ^7 chased ad. σ^7 (+ 2 yrl + ? - not seemingly pregnant; the E. 138.2 D raw group?) which was at stream. The group to creek just below 137.65 Bridge as car approached, + σ^7 followed, + all to 50 yds. W. of 137.6. Two adults 100 yds. SE of 137.6, + ad. + 1 yearling (lost?) across stream from them (12:15). 1:50, drove down road from km. 137. 5 ad. + 1 juv. at foot of E. 135.6 D raw (on short grass flat 2:40). 8 ad., no juv., 100 yds. N. of 134.4. 100 yds. N. of 134, ad. σ^7 + ad. + 2 yearlings (gain of 1). One large yearling had left eye injury which appeared same as one formerly at E. 137 D raw (?? of this group now with this σ^7 ?). None at S. 133 Flat. Atop N. 133 Ridge, saw the 12 ad. + 1 juv. on N. side of this ridge near mouth of canyon. I stopped car

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200 yds. from them & they took to the hills & walked or ran away over a
 brow of hill (100+ yds. move). ^{at least 3} ~~Returned~~ adults in the group N. of
 the loop of stream (6 formerly). Returned up road to km. 137 (2:40).

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Nearly clear, ^{calm} cold dry morning. 6:45 a.m., 7
 adults 100' up slope SE of stream opposite 136.8. Seven seen in
 E. 137 Draw area several times in last 10 days - since the 4 no
 longer there. 4 of the 7 prone, front on backs, chewing cud; probably spent
 night there among clumps Festuca 50' down slope from rocky area.
 5 prone 6:55. 6 of 7 prone in sunshine at 7 a.m. These proved all ♂♂.
 Possibly 1 yling. 7:39, 1 prone. 7:45, all walked to E. 137 Draw &
 up it. 8:30, I drove up road from 137. Adult 100 yds. up
 slope NW of 137.2. Ad. ♂ with 3 ylings 50 yds. NW of 138. 16 ♂♂,
 7 being ^{yearlings} ~~juv.~~, in W. 138.6 Draw. 6 ad. + 2 juv. in bottom of
 E. 139 Draw. W. 139.3 Draw, 3 ad. + 1 juvenile (8:50 a.m.). Juv.
 prone in a bare dirt haul on slope. One ad. pregn. ♀ on side on
 slope; prone 9 a.m. Knee farther back & more out to side than in non-
 pregnant ones. 9 a.m., mother to juv. juv. up, then prone. Mother rolled,
 kicking juv. accidentally. Juv. up. Same mother licked face juv.
 Tongue out only 1-2" & rapidly in & out. Ad. up. Juv. prone, rolled,
 up. Prone 9:03. Same pregn. ad. lay on side, neck & head on ground.
 Another ad. prone (9:05). Juv. chews cud, chews bulging, side to side
 motion of jaw. About same number chews & length time between
 stopping & starting as in adult. 9:10, the 2 adults up but another prone.
 Calm & nearly clear. 9:14, ♂ ran 50 yds. So as one ran across
 road, going W., at 139.15. Others seemed not alarmed. 8:40 a.m.,
 ad. with shatter L. ear & another ad. in W. 139 Draw. 9:16,
 ♂ ran 100 yds. up stream from group as 6 crossed stream &

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ran W. ♂ stood & they passed 50 yds. from him. Group undisturbed.

9:18, juv. up (& all ♀♀), walking up slope to W. with mother. Another ad. ♀ thrust head out & blew at juv. from 3'. 9:19, ♂ ran back toward group which was walking SW up slope. Mother & juv. led group. Apparently some alarm from E. 9:22, mother & juv. running at hilltop, ♂ within 100'; ♀♀ following. Apparent source of alarm was truck and men at km. 140 1/2 on road (making roadworking camp). I ran down road.

9:50 a.m.
The 16 ♂♂ at 138.5. In E. 137.5 Draw, 17 including 1 juv. Two adults at 137.4. The 17 apparently 6 (or +) ad. with juv., including pregn. ♀♀, & a group of 10± ♂♂. Juv. remained on side in sun. Two of the ♂♂ nosed fence pile & gave "wolf howl"; one repeated 4x, each time nosing pile 10 sec. Adult & yearling at NW edge of the draw may be the resident pair; 100 yds. from 8 ♂♂. 10:20, juv. up & ♂ of 6 chasing some of ♂♂, then fled to stream & 4 others joining so 12 ♂♂. Juv. nursed 1+ min. at 10:22. Another ♀, apparently all ♂♂, yearlings, appeared 100 yds. toward stream from the 6 (+ juv.) at 10:28. ♂ fought playfully. Clashing chests, biting knees - all together then fighting as 2 pairs. As many as 10 of 12 ^{♂♂} appear to be yearlings; up to 16 of 18. 10:33, an ad. ♂ (of 2?) chased a bunch of ♂♂ near stream - at least 20 ♂♂ now. I went out to N. near stream past ad. & yearling. 10:38, one fight still in progress, with guttural cries & much rearing & clashing chests & biting of knees. 10:42, fighters to within 50' of ad. & juv. grazing by stream, but no antagonism (ad. watched, ears back, tail slightly out). Fight over 10:43. 6 ad. + juv. 200 yds. SE of stream as before. 11 a.m., pregn. ♀ from 50 yds. SE of 137.4 walked parallel to road & to it at 137.7 & crossed, & up draw. Ad. ♂ at stream had stood at it & raised

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tail hunt did not pursue; then walked upstream. 10:05, lone ♀ grazed 100 yds. up W. 137.65 tributary from bridge. An ad. ♂ 100' from it. ♂ raised fence pile (used by the 7 often) & gave a wolf howl; then def. on pile. ♀ used pile a few sec. Both crossed to SE side road near bridge (137.65). ♂ gave warbling squeal when small boy approached on road to 200 yds. This calling caused about 10 yearling ♂ to run from stream up E. 137.5 Draw. An ad. & yearling joined anted. ♂ (residents?) & these ran separately, higher on slope (10:15). The 20⁺ young ♂ or ♂ retired to 200 yds. SE of stream; the 6 retired S. behind a hill, then ♂ chasing some of the young ♂ or ♂. The 3 (or 2?) walked ^{W.} to top of rocky hill. || 1:30, drove down road from 137. 2 ad. at ^{E.} SW side road opposite 136.2. 100 yds. N. of 134.2, 8 (no juv.) on ruin wash where some vegetation. 133.95, adult & 1 juv. crossed to S. side road & ran up Festuca slope. 14 (1 juv.) 200 yds. S. of km. 133 post, & 3 at ^{SW} SE end of S. 133 Flat. (1:45). 1:55, juv. spread hind legs on fence pile. Juv. ran through group, end to end, & back. One ad. chased it a few steps. 2:05, on bare appearing rolling hills 1/4 mile S. of S. 133 Flat, ^{one} ~~one~~ chased 6 for 1/4 mile, then washed back. ~~for~~ One ad. ran to the barren appearing low hill 300 yds. S. of 133.3 & used pile. & others incl. juv. followed. Juv. & mother prone on bare ground of top this hill. 2:10, 3 strange ones appeared about 200 yds. S. of 132.8, on same side of creek as the 14. ♂ after them & chased them to S. edge of S. 133 Flat. ♂ of 3 at SW end of Flat chased another, which approached over the barren hills to S., to same area. Then ♂ of 14 and one of strangers ran to the 14 group. ♂ reached it & other stopped 50 yds. away. ♂ of the other S. 133 Flat group chased 3 out onto barren ground, itself running 50 yds. out from grassy flat, then

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Huaylarco, 15000'; Dpto. Arequipa

ran back toward its group. The 15th stayed with the 14; not driven off. 6 + 3 out on rolling barren hills. 2:20, all 3 of the other 5.133 groups were out 20-50 yds. on this barren ground, 2 back on green, one prone on barren area 2:30. Still 15 in big group 2:30. 2:40 p.m., on short green grass at mouth E.135. 6 D raw, ♂ + 3 pregn. ♀♀ (no juv.) (4 ♀♀ + juv. yesterday).

February 29, 1952. Dry frosty morning; 4/10 cirro-stratus. at

8 a.m. drove up road from 137. Adult 50 yds. SE road at 137. 4. at least 4 (the 7?) on high bank 300 yds. W. of 137. 7. Dressed ♂ with 3 yr. long. 100' SE of 138. 3. 5 (at 2 or 3 yr. long.) on flat of upper E.138. 2 D raw. 6 ad. + 2 juv. at Broken Bridge Draw. 2 adults (♂ with shorter left ear) 50 yds. NW of 138. 05. About 10 young ♂ or ♀ at 138. 4. 8 ad. + 1 juv. across stream from 139.5 (8:15). I watched them. Juv. finished + ran. 8:30, juv. reared + put neck over bare mother's neck, forefoot off ground, several times. ♂ whistled once looking N. 8:32, ♂ ran 50 yds. S. of group; juv. followed then raced back to mother. 8:35, juv. ran after 5 Thomomys on ground + flushed them. 8:36, one looking NE gave alarm signal + all walked S. along sidehill toward W.139. 3 D raw. Mother + juv. lead; ♂ parallel higher on slope (better view). Group grazed at top of slope, 150 yds. W. of stream (not great alarm). Moved to 139.15. 6 ad. + 2 juv. (^{down} 10 yds. apart) on gentle short-grass slope at foot B.B. Draw. Juv. A head on ground, B head up, but both lying on side. Two adults ran at foot W.139 Draw (or shorter SE). 8:53, ♀ prone 10' from juv. A. Calm, sunny. 8:56, ♀ up. Pregn. ♀, tail up, lay 20' from juv. A. 8:59, juv. A head + neck up. 9:04, prone on slope + to fence pole - stood tail up there 1+ min., then defec.; then

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Huaylarco, 15000; Depto. Argemiro

^{still} Tail up, walked 5 yds. + lay prone 10' from juv. A. 9:07, 9:08, juv. B creep + cautiously to A. A raised head only when B stepped on legs. B off + A on side, head down. Then both juvs. fed (9:12) for 1 min. +. The prone pregn. ad. rose + went to fence pile. Blew at juv. B when it came to 3'. Stood at fence pile 20 sec.; nothing seen to fall. Walked slowly 10 yds. up slope, scratched ground 2x with forefoot, then slowly lay prone. ^{9:15} Birth near. Juv. play together, putting to neck over other's back, biting gently. This 30' from adults who pay no attn. 9:20, prone ^{ad.} juv. on side. Abd. given 3-4 jerks at rate 3/sec. ev. few secs. Neck raised dorsally. Upper foreleg off ground as strain. 9:22, rises, moves ground; tail up T + anal area protruding. anus + vulva dilated. 9:25, part 2" out vulva. Drizzling. Ad. still up. 9:26, head out + moving, mouth opening, flipping up over ear. Tail ad. ^{1 foot} 9:27, ears out, 6" mucous rope at end each. 1 leg out ^{1 foot}. Juv. shaken head + flaps ears (9:28). Ad. walks slowly; grazes a bit. Ceases + head juv. shaken side to side rapidly. Front L. (?) leg out to above wrist, directly over head. 6" string mucous from base ears hang over head. Ad. grazes calmly. 9:31, ad. slowly prone in usual way. Two legs out straight + together (forelegs). :31½, ad. stands, tail vertical. Looks at baby but doesn't move it. Rest of group 50 yds. down slope. :33, about all of neck baby out. Occas. slight shake of baby's head but large lump mostly. :35, foreleg tip nearly to ground, head at ad. ankle level. :36, out to ^{wait} ~~wait~~ falls to ground, thrashes. ^{a pregnant} Ad. to 10' 5 condor adults land 10 yds. beyond newborn. (9:37). Baby prone. ^{Two pregn. ♀♀} + another prone 10' in front condor. Baby head + neck up, ears back (:39). 9 condors, to

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February 29, 1952 Huaylarco, 5000'; Dept. Arequipa
 5' from baby. Ads., tails up, charge with forefeet, ^{condors.} all condors
 ad.; 40707. ^{Two ♀♀} ~~after~~ after 1 condor which taken off. Danger ^{seems} ~~seems~~
 past. All rest of band fled about 9:35, to W. across road.: 43,
 juv. prone, mother beside. Ears long + below horizontal. ~~Helps~~
~~ing is going ad.~~ 9:44, mother prone beside baby facing opp.
 direction. 9:46, 10 condors on ground (one an imm. ♀). Mother up as
 one flies close. Two ad. ^{♀♀} chose one on ground. Juv. gets to knees,
 then falls as tries to rise more. 9:48, 12 condors (2 imm.) on ground.
 :49, juv. to wrists + hind feet under belly of mother. Then all legs up,
 spread wide, wobbly. Nearest road 20 yds. up slope. Juv.
 down after 1 1/2 min. on feet. ^{The} Two other ads. 30-150' from mother +
 away from condors (down slope). Juv. eyes open, 1 ear up. 14 cond-
 ors (5 imm.), 20-60 yds. from mother (9:54). Mother grazes. Tail
 juv. up (9:58) vertical. Gets to feet + falls. Several condors leave.
 10:01, juv. on feet 1 min., then falls + lies prone. Mother beside. Juv. stands
 10:02, head under mother's belly, for 1 min. Condor ^{imm.} lands 20 yds.
 away; other 2 adults run toward it + stand, tails up, 50' short
 + it walks up hill. 10:04, still 7 condors on ground. Juv. (10:03) on
 feet + ^{moves around belly} ~~nearby to~~ of mother. Falls after 2 min. 15 sec.
 10:06, last 2 condors flew off. ♀ tail vertical. Noses belly of juv.
 Vulva clean but about 4" long in pale ringed oval. Other ^{ad.} ♀ nose
 head of juv. Juv. can shake body. ^{head ad. ♀ helper} ~~at~~ within 20' but pays no
 attn. to baby or mother. 10:07, juv. on feet 4 1/2 min. before falls.
 10:11, juv. up. Staggers 50' beside mother. 10:15, mother prone. One defec-
 ing ♀ walks to road at 139. 4. Unilateral area of juv. has V about
 1 1/2" long. Juv. on side 5' from mother 10:16 (4 1/2 min. up). Second
 guarding pregn. ♀ grazes 50' from mother. Juv. now nearly dry

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Huaylarco, 15000', Dpto. Arequipa

with rough wooly appearance. No membranes attached or yet seen.
 :18½, juv. on feet. Walker. Shook head. Semblance of staggering run.
 10:20, ♀ up. Tail 45° up, vulva area bulging. Grazes. Juv. gambols; in run, about ½ sec. per jump. 10:24, balloon of bluish membrane hangs from vulva ♀. 10:27, juv. with head between forelegs mother for 2 min. Then re-muzzles under belly. 10:20, two ad., ♂ + ♀, ran to mother, to 10'; & pruned about; then ran off 100 yds. accompanied by other defending ♀. Latter returns toward mother 10:29. Juv. seemed to muzzle right place to nurse. Up 12 minutes continuously at 10:30. ♂ returned to 50 yds. from mother. It + another ran toward & approaching at S. side of E. 139 tributary. another pregn. ♀ near mother. Truck down road - 150 yds. from mother. Other ♀ stood 5' from it, juv. standing between. 10:32, membranes dropped from vulva ♀. 10:35, mother went 50 yds. E. up rocky mod. slope, juv. following, ♂ + 2 pregn. ♀♀ near. 10:38, one ♀ ran to near mother; ♂ to 10' & squealed, apparently at mother. The 2 ran to W. 139 D. row + back, not chasing. 10:38, juv. fed at L. side mother 1 min. 10:42, mother + juv. 50 yds. S. across slope, apparently other ♀ (pregn.) not of this group! pregn. ♀ accompanying + ♂ 50 yds. behind. Descended to foot of Broken Bridge Draw. ♂ very alert. Mother drank. Juv. + pregn. ♀ nosed noses. Juv. shook body. Regressing; mother put nose 1' from afterbirth for 5 sec. after dropped (the raw red one after bog of water) but paid no further attn. to it. 10:47, juv. prone ½ min.; heels farther posterior & higher than in normal prone posit. Nearly dry but wool somewhat rough. Ears up. ♂ grazes 50 yds. from mother. Juv. only slightly wobbly; runs over rocky slope. Can touch nose to ground & raise up without falling. 10:54, nurses at R.

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Huaylarco, 15000; Dpto. Arequipa

side mother for $\frac{1}{2}$ min. Mother moves flank juv. 10:55, 2 juv. + 7(ad.)
 ad. walking N. atop ridge E. of B.B. Draw (07 + other ♀ gone; chasing?).
 Juv. puts neck under ad. abd., head out on other side. Mother grazes.
 The 2 on N. side of B.B. Draw near top of rocky knoll. 6/10 cumulus
 but calm. 10:59, juv. prone & up again. As far not over 20' from
 mother. 11:00, juv. prone. 11:01, ad. prone 6' from juv. 11:02, juv. up.
 Now head mother & she lifts its face, nose, & head. 11:03, juv. prone, on
 side, then rolls 3x, & up (33 $\frac{1}{2}$). :04, prone beside prone mother, facing
 same direction. 11:12, group of 9 ad. + 2 juv. 100 yds. from 3 ad. +
 2 juv. atop ridge E. of B.B. Draw. A juv. of smaller group nursing.
 The 2 ♀♀ + juv. then lay atop ridge (to 11:15). 2 ad. ran S. along
 slope on E. side stream at 138.8 & were chased by an ad. there. They
 were chased 100 yds. S., then cut downhill & were chased 100 yds.
 N., then on to S. side of E. 139 Draw. Slope E. of 138.8 evidently
 defended. 11:30, mother & juv. still prone as before; juv. neck & head
 up constantly. Baby newborn can get to wrists 10 min. later, feet
 20 min. after birth, & stand 5 min. when $\frac{1}{2}$ hr. old. Mother does not
 chew cud. Rest of group not in sight. The 2 pregn. ad. ♀♀ which fought
 off the raptors were only 2 such in the group of 6 adults. 11:44,
 juv. stood, tail vertical. Mother moved its face & neck 10 sec.; then she up.
 Juv. walks with hind legs spread. Nurses. Mother puts nose to
 its side & rump near base tail 5 sec. (recognition?). Hind legs juv.
 spread wide as nurses at R. side mother facing 45° posteriorly to
 mother $\xrightarrow{\text{M.}} \xleftarrow{\text{J.}}$ Broke off after 1 min. & resumed. Cuddled head out ev-
 ery 15-30 sec. & resumed (3 $\frac{1}{2}$ min. from first start to final stop).
 Then (11:50) mother walked a few yds. & grazed. Mother moved base
 tail juv.; juv. raised tail vertically; mother moved between juv. legs.

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Huaylara, 15000; Dpto. Arequipa

mother 10 yds. to fence pile + spread hind legs. Juv. tried to nurse 15± sec. without apparent success. Constriction about 2" above knobby knees of juv. Still somewhat woozy + clumsy. Juv. gave a jump + a quick run of a few steps. 11:57, juv. prone lay 5' from mother; up ½ min. later. On side: 58. Up + down lay: 59. Up: 59½. Appears dry but not quite smooth fur yet. 12M, juv. down. Sides mother behind ribs. Hollow tho chest still swollen. Ald. skin a straight line from sternum up + back. 12:01, juv. up; then down, thrasher 3X on side. 12:03, ad. prone 6' from juv. Juv. up. Runs 5 yds. away + back to mother: 03½, mother up; juv. prone, then up. Down + up again. 12:05, juv. steps over head grazing mother. Runs 10 yds. from mother + shi toward before it gets back. Juv. lifts feet extra high in walking. 07½, juv. prone 5' from mother; up in ¼ min. 12:10, juv. down + up. :11, prone. Eyes half closed. Still down, head on ground, 12:15. :16, mother moves its side. Juv. raises head from ground when mother nuzzled head. Head + neck juv. not chop-ily. Juv. half on side (prone posit. difficult because of big legs + humpiness?). Still prone, head up, 12:20; mother grazing 10' away. Juv. up: 20½. Runs 20' from mother + back. When stumbles, spreads legs wide apart. Men working at stream at 139.4. Mother walks, then runs S. across rocky slope for 200+ yds., juv. easily keeping up by side at about 15 M. p. h. Apparently went into N. fork of E. 139 Draw. 12:25, ♂ + 2 ♀♀ with juvs. ran S. along ridge E. of 138.0 (some earlier as earlier E. of 139.1 probably). 12:30, on green slope E. of 138.8, 2 ad. + yearling (♂ + pregn. ♀ - ears entire). This group that defended same area earlier today? || 12:35, km. 138.3; SLE ♂ across stream + 5 yds. from a yearling; 5 (3 yrl. + ad. ♀) just SW of mouth of E. 138.2 tributary; ad. + 3 yrl. just NW of stream, ♂

#3

50-lake

5 1/2 res.

25 lake - after 22

1 on lake

09 tails up

5 7 1/2 - on - at down

no tails - 2 are - down

all on should.

♀ head up - spit?

7:01 - with 38 lake, walk away

1 1/2 lake - on stand 15 res - lake

♀ snout lake

7:02 - 07 of 7 chased NE to 50N of 195.

09 - 72 on 2nd; far but rules; ♀ down

05 lake - chase ♀ to 27 - chasing

10 - 07 to 5W; 5 top at 137.9

12 - 1 yrl. off to E. (5 on 5 138 FL.)

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Huaylarco, 15000', Dpto. Arequipa

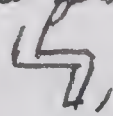
chasing an ad. ♀ with juv. (these crossed road & grazed at mouth W. 138.1 Draw. The 7 were at roadside at 137.9, 4 being prone atop dirt mounds by road. // 12:40, 2 ad. 100 yds. up slope NW of 137.2. // 3 p.m. 6 ad. + 2 juv. at head of S. fork of E. 137 Draw, 1/4 mile from stream. // 4 p.m., 5 adults on Festuca slopes above stone corral opposite 136.2. Apparently ♂ + pregn. ♀♀. ♂ descended slope NE of corral & showed out a lone yearling there (prob. the 5 usually at E. 135.6 Draw). 4:25, the 7 on high bank 300 yds. W. of hm. 137.7. 4:30, ♂ + 3 yrl. 50 yds. NW of 138.1. The 5 100 yds. from stream in bottom E. 138.2 Draw. Three ad. (who?) at mouth S. 138.4 Draw. In E. 139 Draw, 150 yds. from stream, 5 ad. + 2 juv. (ad. + juv. missing; the new one?). A brain dog going upstream. Three of the 5 ^{swallowed} ~~ate~~ quickly, 50 yds. toward dog, mother + juv. standing. No great alarm. Dog moved at that (more fear of black dog?). The 3 returned to mothers. Up N. fork of E. 139 Draw, 9 ad. + 2 juv. (seen E. of 80. Draw this morning on east ridge). 4:45, all ~~4~~ 4 juv. in E. 131 Draw prone. Only 1 of 14 ad. prone. One pregn. ♀ of the 5 ad. has tail held a little out, continuously. By 4:55, ♀ up. // 4:30-5; ad. ♂ 50 yds. up W. 138.6 Draw. 3 p.m., the 5 on S. 138 flat. ^{oldest ♀ has white tip} ~~♀ ♀ may all be yearlings~~ to L. ear. Dog walked across road at 137.8. The 7, 4, & 5 stared. The 4 retired to 100 yds. NW of 138. The 5 moved 30 yds. toward dog. It walked & did not chase vicuñas; walked up E. 137.5 Draw (5:10).

March 1, 1952. 6:40 a.m., drove up road from 137. Saw running 50 yds. NW of 137.9. 6:43, saw ad. ♂ copulating with non-pregnant large yearling there. Yearling prone & calm. ♂ with knees outside hers, thighs parallel, elbows on her shoulders, forelegs down on either side. ♂'s nostrils dilated constantly; ears horizontal & somewhat tremb.

Vicugna

March 1, 1952

Huaylarco

ling; pelvic area moving irregularly. No sounds. Occas. ♀ lifted head vertically to chin or above (spit?). 3 other yearlings looked closely from 5'; then retired to SW 100 yds. 6:50, ♂ yearling following, ran after the 3. ♂ stopped & leached at yearling as it came close past. ♂ put forelegs over chest of a yearling from rear, & in 10± sec. yearling prone & ♂ copulated. 6:55, ♂ again after the 3 who were 50 yds. away. I saw 6 on edge of high bowl 300 yds. W. of 137.7 (the 7? - ♂ + ♀ are in territory of the 7). All ♀♀ held tails vertically. One, near to ♂, counter tail back & forth side to side rapidly. ♂ straddles with forelegs from rear & it prone in a few sec. ♂ wrist & elbow at 90° , elbow just behind shoulder blade ♀. ♀ puts head vertical as if to blow at ♂ but otherwise calm. 7:01, other 3 ♀♀ stretched necks & look closely (5') at rear ♂. It blows at them & they away. 7:01½, ♂ & ♀ lide. ♂ straddles standing one 15 sec., then off. 7:02, an ad. ♂ (of the 7?) came & chased the 5 100 yds. parallel to road, to N of 137.95. Copulated on yearling. 7:04, ♂ again straddled yearling & it prone. Broke apart 7:05. One yearling had gone to the other ♂, 100 yds. to SW. ♂ + 3 the yearlings ran to there & there was much shoving back & forth near 137.6. Strange ♂ finally ran fast to SW across slope & to crest of slope slope NW of 137.4 (and on). The ♂ + ♀ yearlings back to 137.9. 7:12, one yearling ran off to E. across road toward stream. ♂ did not follow. 7:39 ♂ + 3 yrl. still on NW side road at 137.95. // 7:10 + 7:30, 5 on S. 133 Flat as if descended from slope at SW side of flat. One ad. ♂ 50 yds. from stream in bottom E. 138.4 Draw (sees entire). 7:45, km. 139, 5 ad. + 2 juv. across stream from 139.1, a single adult ♂ on road side of stream. The ♀ with 1 day old juv. was 200 yds. from the group, in

Vicugna

March
February 1, 1952

Huaylarco, 15000', Dpto. Arequipa

E. 139 Draw. ^{Low} ♂ crossed stream & was chased by ♂ of B.B. group up E. 139 Draw; chasing ♂ stopped & other went on but was chased back down draw by ♂ of 9 ad. ♂ of 6 ad. then chased it N. up rocky slope. The ♀ with new juv. walked to group, juv. close beside. Other mothers stretched necks & put noses close. Mother of new juv. pushed back head of another juv. with her own head. New juv. was blown at when walked near another mother. The group of 6 ad. + 3 juv. thus united (first time since yesterday forenoon?). Two older juvs. prone side by side (7:55), the youngest with mother 100' away (older ones shunning?). I will rename the 3 juvs. in order of birth: "1" (eldest; recurved ears), "2", & "3" (born 9:30 a.m. yesterday). Calm 1/2 overcast morning. Men working on road at 139.35 just out of sight of the 6 + 3j. 8:03, ♂ of 9, tail up, ran 30 yds. toward the 6; ♂ of 6 quickly interposed itself, tail up, & the 2 ♂♂ stopped 20 yds. apart & grazed (territorial boundary). The two groups ♀♀ about 100 yds. apart

(8) ♂ ♀ (5) → stream
 9 6 West.

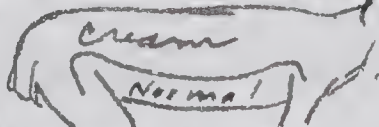
Drove down road. 8:15, ad. & yearling. at mouth E. 138.4 Draw. Ad + 3 yrl. 70 yds. NW of 138.1. No attack made on 6 or 2 ♂ that went SE & across road at 137.9. The E. 138.2 5 at road end of S. 138 Flat (8:20). Adult & yearling in E. 137.5 Draw, 50 yds. from stream. || About 4:30 p.m. I walked up road 137-139 & saw ^{only} the 4 & 5 near 138. But about 5:45 p.m., returning over same route, saw both E. 139 Draw group (ad & 9 ad.), the 5 on E. 138 Flat (2 prone on slope; sleep there?), the ad. + 3 yrl. N. of 138, the 7 ¹⁰⁰ ~~200~~ yds. W. of 137.6. Apparently groups return to usual haunts & stay close grouped before sunset.


Vicugna

Feb-March 2, 1952

Huaylaro, 15000; Dpto. Arequipa

1:15 p.m., about 5000 ft in vicinity of Broken Bridge. A juv. (+ mother?) at edge of group. One full ad. ♂ had back a coffee in cream color, & face also very pale, so conspicuous. The round side color started in a line passing over apicula & from back & connected between




March 3, 1952 at 6:40 a.m. drove up road from 137. Clear & frosty. ♂ + 3 juv. 100 yds. NW of 138.1. Two ad., ♂ with shorter L.H., at foot W. 139 Draw. The ♂ chased ♀ 10± yds. up slope on another ♂ ran thru area & across stream (138.1). Latter ^{probably} ~~perhaps~~ ♂ of 3 ad. 5 ad. + 3 juv. on rocky-grassy slope 200 yds. E. of 139.1. Some of 9 groups visible in N. fork of E. 139 Draw. 7:15, a smaller juv. with 5 ad. mixed. By 7:20, ♀♀ + ^{juvs.} ~~juvs.~~ down to gentle slope at base of hill (SW base). Two juvs. (clear prob.) together visited fecal pile. One (#1?) urinated; then taking stone again let 2 black pellets fall. Obviously, feeding from origin urine stream. It raised face & shook head side to side; repeated 2x. Tracked down road to 139.34 all juvs. ran to group of ♀♀. Antips of #1 slightly curved still. It came about with another (#2 probably). 7:25, #3 prone, 50' from nearest ♀. Lies prone in usual adult manner, without clumsiness. The 2 older juvs. writhed restlessly, one putting neck over back of other's. Two men walked down road to car at 139.15 & back; vicuñas 200 yds. away moved 100 yds. farther away & around brow of hill; then down near E. 139 tributary. The 2 in W. 139 Draw fled. 7:49, juv. prone. Up 7:50 as another juv. near it. One juv. (youngest?) slightly away backed, perhaps because back still thin. One pregn. ♀ with tail constantly out  & anal area bulging. 7:53, 2 juvs. prone alongside each other; then third prone 5' behind them. Difficult to distinguish between smaller 2. A pregn. ♀ + ad. ♂ (of 9 ad.)



Vicugna

March 3, 1953

Huaylarco, 15000; Dpto. Arequipa

graze 100 yds. E. of the 6 ad. The juvs. all up 8:05. Together, they acted like grazing. Two prone 8:08, then up as all groups ran 10 yds. or then d. + w. on fence pile (10:10) // 8:15, lone ad. or in w. 130.6 Draw (red splashed R. freely; flattened wool lower R. side); juvs. entire .5 in E. 130.2 Draw, at foot of slope near SW Branch. About 30 or 20 just SE of stream opposite 130. 7 on high green bank 300 yds. W. of 137.7. 8:20, or of 5 walked 100 yds. from ♀♀ toward or or approaching 250 yds. farther away. 8:25, the or group numbered 46, spread from stream 200 yds. to E. 8:40, or of 5 ran at the 46 & they ran to stream; or of 5 not closer than 100' to any but stood & stand. Of the 46, ^{a maximum of} about 10 appear to be full adults (over 2 yrs. old). One raised brace tail of a smaller one & latter turned & blew at other. 9:05, an eighth ran into the 7. One (or?) in group chased 322 in succession a few yds. Some of 46 made short leaps in slowly flowing water. Some stand in water & graze at sides of grass islands. A yearling or had testes visible, perhaps $\frac{3}{4}$ " long, when thighs appressed. One, prone, has thigh vertical, resting on knee, ^{foot} medial of knee. 9:15, left. // 9:20, 137.5, 2 ♀♀ with 1 juv. ascended slope to NW, or 100 yds. SW of them (the resident group, now with juv.?). One ad. at stream opposite 137.4 (E. 137.5 Draw or?). // 1:30, drove down road from 137.50 yds. N. of km. 135 post, 7 ♀ + 1 or ad., no juv. or gave stringy descending warble (7x, descending, in one series). or 100 yds. from rest of group. // 1:50, 3 100 yds. S. of km. 133, all ad. One d. + w. on pile, then kept tail partly raised. 200 yds. SSE of 133, across creek, group of 12 + 1 juv. Still, yelping in groups. A pregn. ♀ chased a thinner one (mother?) 10 yds. & about 3x put its forelegs atop back of the other. 2 p.m., juv. nursing. Mother then d. + w. on pile; knee & ankle angles about 100°  Juvs. then onto pile, treading π with



Vicugna

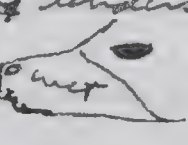
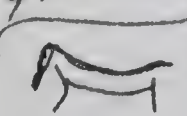
March 3, 1952 Huaylarco, 15,000', Dpto. Arequipa
 forefoot before turning & spreading legs. Hind legs little flexed as in OT.
 An ad. nuzzled head & neck of juv.; juv. tolerant. Ad. ♀ nuzzled pile & shook
 head; walked 50' to another pile & urinated. 2:10, juv. lying on side. Fair
 W. wind & 8/10 cum. - str. clouds. 2:15, 1 of 3 & 2 ^{ad.} of 12 prone, facing
 more or less downwind (strong). 2:30, all 3 up; 1 of 2 up & another of
 12 prone. Juv. ^{up at} ~~still prone~~ 2:31. Juv. ran almost constantly, around the
 group & up to 50 yds. away from nearest, then back. Assoc. 1 ran
 10± yds. after it - apparently mother & OT of group. OT of 3 ran 50
 yds. toward the 12, to near the creek, & stood; then lay prone as light
 but hard driven hail started (2:39). Two of 12 prone 2:40, & a second of 3.
 Juv. prone 2:42, apparently going down on both urinals & bending both el-
 bows simultaneously. Hail stopped. 2:45, 3 ad. & juv. of 12 still down, & 1 of 3.
 2:48, all of 3 up & together, & 2 ads. of 12 up (1 + juv. down). 3 p.m., 2 ad. & juv.
 of 12 down; windy & overcast. By 3:10, 1 ad. up ~~but~~ but 2 others down (of
 12). 3:15, juv. & an ad. up, but 3 ads. now prone. Juv. to a pregn. ad. which
 blew at it, then to pile (legs spread 20± sec.), then lay prone near prone
 adults. 3:25, only 1 (ad.) of 12 prone still. Juv. nuzzled about 2 min.
 at L. side mother. The 3 about 200 yds. ^{SW} of km. 133, at edge
 of sandy hill. Then snowed until dark.

March 4, 1952. 1" crusty snow. 6:43 a.m., same upon ad. OT &
 4 juv. ^{yearlings}, 50 yds. SE of 138.2, OT copulating with 1 yearling. Yearling
 prone & head & neck looked around freely. OT bore weight mostly
 on ~~and~~ metatarsi which were horizontal on ground, knees not
 quite touching ground. Bare tail OT & "above ground, tail
 ant. behind on snow. Forelegs straddled chest of yearling; some-
 times flexed, sometimes straight with hoofs almost to
 ground. Ears OT horizontal & occasionally vibrating. Series

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of pelvic thrusts of perhaps "given at rate of about 3/sec. by ♂, but none for long periods. Hind feet often shifted slightly. No sounds. ♂ later at another yearling which came to 5' 6:55, both up, ♂ after some ♀ + put straight forelegs astraddle ♀ just anterior to thighs, then worked forward + at times raised hindlegs just off ground, ♀ bearing full weight. ♀ turned so ♂ with chest + forelegs over her back from side. ♂ of 5 across stream (just S. of mouth of E. 138.2 tributary) came toward the other group + latter ♂ chased it back. Tail of ♀ cop. with considerably matted up + crossed. By 7:10 no more mountings by ♂, but one yearling moved bare tail of another + was then chased back by latter 2 yds. (this one possibly 2 yrs. old - the extra one in group). One yearling, tail up, ran at another, which retreated 5 yds. The one cop. with definitely a yearling. || 7:15, about 35 ♂♂ at mouth of E. 138.4 Draw. SLE ♂, alone, 50 yds. NW of 138.4. Latter to edge of stream, tail up, when the ♂♂ at opposite bank. The 35 grazed spread 200 yds. up & down stream. No passing of snow; dig mounds at sides of clumps. 7:40, one ♂ at stream at 138.7 (resident?). 7:45, 138.9, ♂ of 6 ad. chasing 2 ♂♂ (on ^{E.} side stream) to S. The 6 (+ 3 juv.) then at foot of Baker Bridge Draw. At foot of W. 139 Draw, shorter L.E. ♂ + 2 ♀♀. At fork of E. 139 Draw, 8 ad. visible (7:45). 7:55, at foot W. 139.3 Draw, 8 ad. + 2 juv. (juv. off 1 juv.). The juv. together, 50' from nearest ad. Now one prob. over 1 day old. 7:59, both juv. nursed. When younger (#2) trying to start nursing, ad. pushed its head away with knee, + another ad. was licking underside of vertical tail of juv. Faces of some wet from snow . ♂ has light line on R. side, hair below being paler than hair above on side (reverse of normal). Line appears , much as division between cream + reddish hair

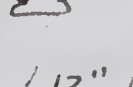
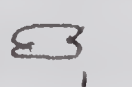
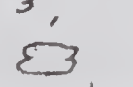

Virginia

March 4, 1952




Huaylarco, 15000'; Dpto. Arequipa

strange on \nearrow seen March 2. Group worked upstream. \nearrow followed 100 yds behind. \nearrow def. on snow-covered free pile. // jaws. of B.B. group lay prone on snow. // 8:15, a turgid ♀ had tail out from body 3"; as I watched, black skin of anal ~~area~~ ^{area} pulled out tight, then quickly collapsed 10 sec later, & tail down to normal. The tail-out not constant but may last 10+ min. at a time, & several days before birth. Truck to creek at 139.3 & group walked away to NW, jaws. with mothers going highest on slope (8:22 a.m.). Examined tracks in snow.

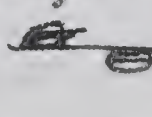
1-1 1/2 P+    snow track ^{returning from} ~~going~~ to edge terr.
 Above have reverse lead each pair tracks (fore & hind).

    to edge territory

These alternate one pair wide & another closer, fore & hind feet, same lead each pair.

In upper set, pair of feet often , offset only 1/2 width of track, only 3/4" between two tracks at closest point. Toe scratches extend forward from tracks; wider groove may be 6" long behind track (in 1 1/2" deep soft snow). Upper set slower gait. In parts only 12" between farthest spaced adj. tracks. Lower running, up to 3' between closest tracks. Tracks of adult had length & width  

Of juv.:

Walking: sometimes hind foot & front foot prints in line, one behind other, tangent, but rarely one atop other. Fore & hind feet offset , medial edges in line. Clean eater; only 2 plant fragments found ^{near many} ~~near many~~ slumps where fed.

I drove to +38 & saw a mother by newborn juv. in

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E. 139 Draw, 200 yds. E. of stream on open gentle slope. I went to 6' from juv. & photographed it. Mother stayed 100 yds. away giving descending whistling warble (cannot tell ♂ & ♀ by call). Juv. wet & with mucous membranes. It tried to stand & took 2 or 3 steps. Then remained prone & allowed close approach (first up when I to 12'). I stayed 5 min. near juv. & walked back to car at road, leaving juv. 9:25. It remained prone on snow, neck & head up. Mother gradually toward it but went past at 100' dist. & to opposite ^{side}. She stored much at the juv. from 50 yds., not at me. 9:40, still 50 yds. from juv. Then juv. staggered to feet, widespread hind legs up first. 6" bloody V at navel & a few large strings of mucus pendant. Pale ring all around eye. Mother then walked to the juv. Juv. could raise tail vertical, shake body, & ears vertical. Still very wet. Bright sunshine & snow on ground. Mother led juv. 100 yds. across & up mod. slope. It walked & even ran. Juv. fell (9:44) after (9:42½) after 2¼ min. up, but immediately up. Fell at: 44 & up. Nosed under belly & much. Juv. even ran a bit. :48, afterbirth started out. Soon a blue ball or hanging. ♀, tail up, but walked & paid no attention. Bag of water to heels, then ~~sent~~ remainder out & to ground (9:51). Ad. put nose to it for 3± sec. & paid no more attn. Juv. frothed nearby, hair of back still plastered down by ^{dried} mucus. Ad. tail down by 9:53, & she & juv. 130 yds. N. (& uphill) from place of birth. No sign of condors this time, or of other adults defending juv. & mother (from me). 10 a.m., juv. fell on side on snow, then rolled over dorsally, as if purposely, & rose, shook body. 10:02, was walking up road; ♀ & juv. to crest of rocky hill (E. of 139.1) & over it. I drove down road. 10:05, 35± ♂♂ in W. 138.6 Draw. SLE ♂ 50 yds. NW of 138.5, alone. Ad. & yrling. in E. 138.4 Draw, 200 yds from stream (10:10). ♂ & 3 yrlings. 50 yds. SE of 138.2, & the E. 138.2 group (5) 50 yds.

40' & up
walk - run
42½ feet
44
under last.

48 - qft.
51 fell - nos

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Haylarca, 15000', Depto. Arequipa

across stream from them. 10:15, 7 groups on high grass bowl 300 yds. W. of 137.7. Snow all melted at $\frac{1}{2}$ 137 $\frac{1}{2}$ at 138 $\frac{1}{2}$. 9:25, 2 ad. 100 yds. SE of 137.2. 10:30, 2 in E. 137 Draw; apparently ad. ♂ + 2 yr. old ♀. || at 3:45 drove down road from 137. On short green ~~grass~~ grass flat across stream from 135.6, 6 ad. + 2 juv., juvs. running back & forth together. Younger juv. a shade darker brown than the other. Both juvs. prone at 3:50 p.m. All overcast; hail earlier this afternoon. I drove up road. Snow from NE at 4 p.m. 4:03, ~~at~~ ^{7A} ^{at} ^{100'} W. of 137.7. One rapid ^{purists + perfect} ~~flicker~~ ^{alternately} 5x, then lay prone facing downwind. 4:05, ♂ + 3 yrl. 50 yds. NW of 138, grazing. 138.7, 35 ± ♂ + ♀ near stream, about 10 prone facing downwind. I saw coming at low angle ~~from~~ ^{from} E. of 139, 4 of the 6 ad. on ~~SE~~ ^E bank of stream, one grazing & others prone. One juv. 20' to windward of closest ad.; crosswind. Two juvs. side by side, parallel, crosswind, 10' from nearest adult (4:10). Steady snow. Other 2 ads. 50 & 100 yds. up wind from the 4 near stream. First was new mother. 4:25, it apt to stream, then to main group (+ other ad. too). All ads. up but 3 older juvs. prone. Pregn. ♀ approached by newest juv. (#4) & it pushed juv. head away with its muzzle. Juv. + runs fast up to 20 yds. from mother & back. When mother at stream, juv. 4 waded in water. Mother & juv. 4 stay 100' from others most of time. 4:30, juv. 4 nurses at L. side mother. Tail up for mother nodd tail area. A ♀ d. + w. on pile. ♂ ran to pile, nodd it, gave wolf howl. Then urinated shortly & ran after a mother & another ♀, each in turn for a few yds. (they ran away), then grazed. 4:35, a juv. (#3?) nurses. Other 2 remain side by side. 4:38, juv. 4 in ♂ urination stance for $\frac{1}{2}$ min. The two prone juvs. up. One nurses at L. side mother. Snow fine now but still wind-driven from N. One ~~of~~ juv. (#1 or 2 prob.) urin-

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Huaylarco, 15000'; Depto. Arequipa

ates; stream indicated. 4:40, group crosses to S. over E. 137 tributary & ascends slope. Mother & juv. 4 lead ^{100'} other juvs. more together than with individual mothers (already as when older). The group goes E. along slope, or 50 yds. behind (4:45) (possibly or group downstream). ♀♀ lead to or, 2 juvs. 100' before others. There 6' from or but no reaction. ♀♀ + juvs. to rocky slope opposite 138.9, or 100 yds. farther S. along slope & herded away several of group of 50+ or or. One juv. (#4) stays with mother, 50' higher on slope than other juvs. & ♀♀ (4:55). or running back from SE side of stream opposite 138.8 (4:56). Group to 20 yds. from or, across from 138.85 on green mat slope, pregn. ♀ + a juv. first by 100'. 2 lagging ♀♀ had juvs. with. 3 p.m., light snow resumes. Two juvs. follow or to feces pile, 50 yds. from nearest ♀, then back to ♀♀. or urinates 1 min. 50 sec. steadily, then runs downhill to edge of stream (many or or 100 yds. W. of him). 50+ or or spread 250 yds. 5:06, or (of 6 ad.) crosses stream to road (138.8) & drives or or back S. parallel to road. No sounds. This or then back across road & stream & drove or or S. of opposite ^{138.75} 137.5. I drove down road. 8 or or in E. 138.4 Draw. Usual 5 in E. 138.2 Draw. Ad. & yrl. near stream at mouth E. 137.5 Draw. 7 (no yearling or non-pregn. ♀) 50 yds. NW of 137.55. 14 or or 50 yds. SE of 137.2 (5:20 p.m.). Not answering.

March 5, 1952

6:45 a.m., drove up road from 137. Ad. & yrl. at mouth E. 137.5 Draw. 8 at edge of high bowl 300 yds. W. of 137.7. In W. 137.6 Draw, an ad. or, & at head of draw, 100 yds. N. of center, the SLE or. 6 ad. + 3 juv. (6445) in E. 139 Draw. Three juvs. frolicked & wrestled together, the other (#4 prob.) stayed by mother. At foot of W. 139.3 Draw, ♀ ad. + 2 juvs. One juv. nursed. 1/2 min. later other touched nose to thigh of mother, mother raised side of juv., & latter nursed (frequently 2 nurse about same time; following reaction?).

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Huaylaray 15000', Do to. Araguipa



One pregn. ♀ had tail out & anal swelling for 1 min. (about). 7:13, both juvs prone, & 1 ad. 100' down slope from them. One mother to prone juv. & nodd back & back of head, then walked away. Group working up W. 139.3 Draw. Some staring to SE. 7:14, one then other juv. up, & all group walked up draw to 50' higher level (retreated there yesterday when disturbed). I drove down road. None in E. 139 Draw so evidently some disturbance. In mouth E. 138.4 Draw, 8 ad. + 1 juv. (♀♀ pregnant). Ad. + 3 yrl. (7:30) came across, road at 138.34^(to SE) went on across stream to foot of Rocky Hill. all or 07 (the ~~rest of~~ group?). 07 of 8 ad. came 50' toward, then back with ♀♀. Juv. scratched high on shoulder with hind foot, knee above level top back in process. 7:40, juv. nursed at L. side mother. Juv. walked 100' from mother to feces pile where pregn. ad. d & w. Ad. turned head & neck far back toward juv. juv. back to mother. Within 3 min, 3 other ♀♀ & juv. used same pile. One pregn. ♀ maintained stance for 1 min. tho d & w. took only half that long. Juv. held stance 40 sec. 7:50, juv. lay prone. 7:54, ad. ♂ came down draw & chased 0, not resisting, 50 yds. up rather bare slope to NE. Then ♂ to feces pile where ♀♀ had gone, nodd it & shook head, defec. briefly, then ran up SW side draw to 50' from yearling. The 4 ♂♂ reached mouth of E. 138.2 Draw & were met by an ad. ♂, so retreated to N. across slope, but met by E. 138.2 Draw ♂ just outside mouth that draw. The spring (of E. 138.4 pair) stood at a running visacha & walked slowly after it, ears up & tail slightly out. 8:05, the pair to bottom of E. 138.4 Draw, leaving the 4 ♂♂ unmolested. Yrling. of pair ^{went} 50 yds. up slope after one, then another visacha, staring intently at them from 5-10 yds. distance. || 8:10, 5 in E. 138.2 group. 2 sure yearlings, other 2 ♀♀ perhaps 2 yr. olds but none ~~appears~~ ^{appears} pregnant, & ad. ♂. 8:15, ♂ ran up draw as 6 ad. & 2 juv. (pregn. ♀♀) crossed SW corner

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E. 138.2 tributary at head draw. The ♀♀ followed 50 yds. behind ♂. ♂ stopped 100 yds. from intruders & stood staring at them. 8:18, ♂ 100' toward 6 ad., ~~stopped~~ ^{stopped} & def. on pile, then on after the 6. They up slope 20 yds. ahead of him. ♂ of 6, tail up, dropped back & ran at 5 ♂, keeping him 20 yds. from ♀♀ as they slowly walked up slope SE of SW branch. 5 ♂ stood & watched. || 8:20, ♂ + 3 yrl. ♀♀ were 100 yds. NW of him. 138. || 8:24, ^{of 5} ♂ returns toward ♀♀. || 9 a.m., drove toward Holitaris from 137. at road at 136, the 6 ad. + 2 juv. They ran to stream opposite 135.7. 8 ad. on sidehill N. of 134.4. On S. 133 Flat, 11 (+1 juv.) + 3 (at SW end) & another ~~running~~ ^{running} off over barren hills (9:30 a.m.). N. of him. 131 saw groups of 6 (1 juv.) & 5, & 9 200 yds. N. of 126. Returning, about 1 p.m., saw 11 ♂♂ near km. 126. 1:15, 4 ad., each with juv., walking E. near 132.5. They went to top of N. 133 Ridge & young lay alone (no ♂; split group?). Across S. 133 Flat, about 1/2 mile from km. 133 post, the 12 (+1 juv.) & 4 others. Km. 134.2, 8 ad. at foot of slope to N., & 4 (3 pregn. ♀♀) N. of 134.4 (from?). The 6 + 2 juvs. across them from 135.5. About 13 ran S across road at 136.5 as a llama group with 2 men passed 200 yds. from them (not on road).

March 6, 1952. Drove up road from 137, 7:40-:55 a.m. Two ad. on NW side stream opposite 137.2, & 3 across from them (apparently ♂, pregn. ♀, yrling). The 7, all ad., 50 yds. N of 137.65 bridge. Usual ♂ + 3 yrl. near stream at 138.2, & 5 in bottom of E. 138.2 Draw. One group with juvs. (9A?) in N. fork of E. 139 Draw. In W. 139.3 Draw, 8 ad. + 2 juv. ♂ ran N. chasing 2 ads. to draw opposite 139.5. Clear, calm day. 8:07, ♂ back with herd, making lanes in draw. Juvs. play together. One juv. prone, then other 8' from it at 8:16. 8:25, both juvs. up. One moved at R. side mother for 2+ min. ♂ 50 yds. down slope (at foot) from other.

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By 8:35, both ^{lying down} juvs. prone, one 5' from prone ad. (mother?), other 50' from nearest other, both on side with head up. Another ad. ♀ also prone. 8:36, ♂ moved from side; second side used by him in 15 min. Three rolled on grass or dirt. 8:45, second prone ad. rolled & up. 8:55, 4 ♀♀ down near ♂; 3 ♀♀ (1 prone) + 2 juvs. (lying down) 50 yds. up slope from others. 9 am, juv. & mother up & run toward others; other juv. ^{up &} follows by same ad. ♀. One ad. ♀ blew at other, facing same direction 8' apart, & gave low grunts. The two juvs. ran & fought together (took a few minutes of this). 9:25, back up road, & mother & juvs. uphill to W., then all, or last, to crest hill 100 yds. from road. 9:30, the 6 ad. + 4 juvs. at foot of B.B. Draw, all juvs. lying down, 2 ~~together~~ ^{together} & other 2 separate. (In B-group I once saw ♂ chase an ad. ♀ 5 yds.). 9:35, shot LE ♂ & 1 ad. ♀ in W. 139 Draw. 9:40, SLE ♂ at NW side stream at 138.3. 3 yearlings (prone) & ad. ♂ on SE side stream opposite 138.2. One yearling with hocks 8" above ground & behind tail 6" . Of the 5 in E. 138.2 Draw, & seemed to hock in tributary; then out on SW bank. || 10:30, 7 ads. 100 yds. W. of 137.7. ♂ on opposite side road eyeing 5 ♂♂ across stream from him. || 10:50, hms. 138.8, ad. ♀, pregn. ♀, & yearling at stream, latter 2 in water & both in same. I parked 100 yds. from. ♀ & yrl. went 50 yds. up opposite (SE of stream) slope. ♂ stayed by stream & squealed for 5± min. as many as 10 squeals in series. at first strident & high, & fast, then slower in a whistling warble , dropping about 2 notes in warble, then up, & down again. Finally ♂ across stream; def. on 2 feces piles 50' apart, then up slope. ♀ def. on pile, then prone among rocks & up 1 min. later & prone at 50' distant spot, chewing cud. Tail slightly out most of time & in advanced pregnancy. Yrling. & ♂ prone 50 + 100' S. of ♀, all facing away from slope.

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11:12, ♀ up, walked to yrl. + it up; both to 10 yds. S. of ♂ + lay prone 10' apart. 11:27, ♂ up as 2 ads. in chase passed 200 yds. to N. Then ♂ prone again. ♀ + yrling. up 11:30, yrl. prone again, + ♀ grazed. || 11:35, 6 ad. + 4 juv. in E. 139 Draw. I drove to E. 138.4 Draw where group of 13 (argu. ♀♀ + 2 yrl.) + 2 juv. was being driven to N. by a ♂. When group out of draw, near stream, ♂ of 13 came back + stood stiffly 6' from other ♂ for several seconds (I photos some of this, 16 mm.). ♂ of group later chased rider with juv. a few yds. (naive). The 13 then N., + at 138.8 were driven 100 yds. farther N. by ♂ of 3. Then on to mouth of E. 139 Draw (12 m), where 6 ad. + 2 juv. were. ♂ of 6 ran after them, pursuing very hard, then stopped other just, + again chased to foot of B.B. Draw before running back toward its own group (12:07). ♂ of the W. 139.3 bunch then ran across stream + road + up rocky hill to 100 yds. E. of 139.3, + the 13 walked up B.B. Draw. The W. 139.3 ♂ went to head of B.B. Draw + chased them. This group of ♂ + ♀♀ chased by 4 successive resident ♂ + ♂! 12:30, 3 yrl. + 2 juv. old (est.) ♂ grazed at 138.2 + pay little atten to car 100' away. || 3 p.m., a group of 60± ♂ + ♂ came upstream near km. 137. 2 or 3 fights + chases going on constantly. Strong fighting in E. 137 Draw (resident ♂ involved?). Then all grazed peacefully on NW side stream opposite 137.2. (I took notes some fighting). 3:15, ♂ came from E. 137 Draw across stream + drove all ♂ + ♂ about 100 yds. to NE, a few at a time, by walking up close to them + standing stiffly, mainly. Light hail + 1/2 hr. snow; then overset cum. - sleet. || 5:45-6:15, drove 137 to 139 + return. The W. 139.3 group about 500 yds. W. of road, alone + beyond head of W. 139.3 Draw. The 9 ad. + 2 juv. in N. fork of E. 139 Draw. Same 3 ad. on this morning across from 138.8, so

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probably residents. 470707 in lava E. 138.4 Draw. Usual 5 in E. 138.2 Draw. About 200707 on S. 138 Flat. 3, apparently 2 ad. + 1 yearling (or 2 yr. old) near stream at mouth E. 137.5 Draw (or this morning; prob. residents). The 7 ad. near 137.65 Bridge. 1007, only 2 appearing adult, at 137.1, + 5 in draw NW of 137.5. One ad. high in S. Fork of E. 137 Draw. None prone at sunset or when first planets visible.

March 7, 1952. At 6:10 a.m., about 10 min. after sunrise, the 100707 seen late last evening were 100 yds. up slope NW of 137.1, + prone. Then all chased down slope (6:30) by one of 2 above 137.2. 7-7:30, drove up road from 137-139. Usual 5 in E. 138.2 Draw. 6 ad. + 4 juvs. near stream opposite 139.1. Shorter 407 + 1 ad. ♀ in W. 139 Draw. Some Indians shot a young or vicuña in hand of 1 ad. + 4 1007 yr olds. Wounded one walked slowly 80 yds. uphill + lay prone & could not rise. Others payed no attn. to wounded one. 8:15, came down road from 139. The 9 ad. + 2 juv. at head of W. 139.3 Draw (man working on road at 139.5). 6 ad. + 4 juv. at S. side mouth E. 139 tributary. 9 ad. + 2 juv. at fork E. 139 Draw. Ad. + yrl. at mouth E. 138.4 Draw. 23 0707 near stream at 138.2. Ad. + 3 yrl. 0707 (seen here before), joined the 23 so 27 0707. The 5 at head of E. 138.2 Draw. 27 0707 came stream from 137.8. The 7 ad. 50 yds. N. of 137.85. 57 + 9 ad. 50 yds. SE of 137.4. Ad. + 2 (1 or 2 yr. old) near mouth E. 137.5 Draw. Passed 137 at 8:35. No more seen until 135.4 where 9 ad. + 4 juv. 100 yds. to SE. 07 to side + gave wolf howl. It squealed at me, 200 yds. away, + all group went uphill (rocky, yacuta) to S, except one ♀ + juv. which ran downstream. There ran to group of 13 ♀♀ (+ 1 juv.) at road at 134.9. 07 ran to meet it but let it pass + join.

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another ♀ with juv. same dawn S.134. 4 ♂ saw + was met by ♂, but it did not join but went off to W. + across road, independently. Then ♀ + juv., ♂, + 15 ♀♀ with 2 juvs., all to N. of road on flat in 134-134.5 area. ♂ ran 100 yds. ahead of group toward lone ♀ with juv. but stopped 100 yds. short of it. No yearlings in the 16 - this biggest bunch I yet seen. Perhaps ♂♂ gather them during rut. || On S.133 Flat 11 (or 12) ads. + 2 juvs. I was walking by lake, 600 yds. from them, + they fled to SW end of S.133 Flat + 300 yds. out on barren appearing rolling hills, a wave of nearly 1/2 mile. || At 10 a.m. I was atop N.133 ledge. In loop a group of 56, prob. all ♂♂. Across N. limb of loop a group of 5. ♂ of these crossed stream + went 100 yds. across, driving some ♂♂ back to S. ♂ lost ♀♀? - or in big group near 134 same as usually here? || 10:20, on hillside N. of 134.1, 17 ad. + 3 juvs., so evidently other ♀ + juv. joined this bunch. || 10:40, 8 ad. + 2 juvs. at foot of S.135.5 Draw (same as fled earlier minus 1 ad. + juv.) apparently augmented ^{which were} 6 ad. here. || About 6:30 a.m., I saw 7 ad. + 2 juvs. 100 yds. SE of E.137 Draw. at 10:55, similar group bathing in stream opposite 137.1. All walked into lower E.137 Draw, then, + before 11:00, ⁵ (incl. 1 juv.) were prone on bare soil (drying after bathing?). 11:15, the ^{adults} 7 at stream opposite 138. Ad. + 3 yrl. at stream opposite 138.1; some yrlings. bathed briefly. About 20 ♂♂ in draw NW of 137.5 + 138.6. at 138.8, 2 ad. + yearling at stream (11:30; residents). 11:45, 8 ad. + 2 juvs. at + on E. side road at 139.3, but all to W. side of road when car approached. 12 M, the 6 ad. + juv. at mouth E.139 Draw, half of them lying in sun. About 8 of 20 ♂♂ on side or prone in sun. 12:10, ad. + 3 yrl. near stream at 138.1, all prone.



Vicugna

March 7, 1952 (+ 2 juvs.) Huaylarca 5000; Dpto. Arequipa
 12:20, the 7_A at E. 137 Draw. One ♀ with anal bulge. || The number of ♀♀ (11) gained by the hms. 134 + 135.5 groups is = to number lost (if so) by N. 133 Canyon etc. || 2:40, drove up road from 137. The 8 ad. + 2 juvs. at stream at 139.25. The ad. + 3 yrl. in W. 138.1 Draw. || 5:30 to 6 p.m., drove 137-139 & back; almost no vicuñas (dog?); usual 4 + 5 near 130.2.

March 8, 1952. 7:10-7:30, drove 137-139. 3 in E. 137.5 Draw. The 7 ad. 100 yds. NW of 137.8. Usual 4 at 130.3, 4 + 5 in E. 130.2 Draw. 6A + 2J at stream opposite 139.1. The 9A + 2J in draw across from 139.5. about hms. 142, a group 8 ad. + 1J close to road. Clear calm frosty morning.

March 9, 1952 3 p.m., driving from 139-137, saw the 9A + 2J across stream from 139.5. 9A + 2J across stream from 130.3, a displaced group (from upper E. 139 Draw?). 5 on S. 138 Flat. In E. 137 Draw, 7A + 2J. ♂ chased 2 ♀♀ in succession a few yards. At people walking near trailer, 150 yds. away, the groups to SE up Feston slope.

March 10, 1952. Frosty morning, low fog before sunrise, cirrus haze. 6:15-6:45, drove 137-139. Two ad. 100 yds. up slope NW of 137.2. The 7 ad. (5^{or 6} juvs.) on high bawl 300 yds. W. of 137.7 (W. 137.7 Bawl). ♂ + 3 yrl. 100 yds. NW of 138, all grazing. 5 on slope SE of S. 138 Flat, descending to flat. A group at ridge top above Broken Bridge Draw (perhaps the residents; with juvs.). The W. 139.3 group at edge of flat at head of draw. Three still prone 1/2 mile W. of them (6:45). 6:55, the 7 50 yds. NW of 138, the 7 still on W. 137.7 Bawl, all grazing. 7:05, ♂ + 2 yrlongs (♀♀?) at mouth E. 137.5 Draw. The 2 adults 50 yds.

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NW of 137.2, descending slope, at 7:10. 7 ad. high in SW branch of E. 137 Draw. across stream from 136.7, 9 (prob. orcs), + about 4 more 300 yds. SW of them. These 9 proved to be 5 ♂, 6 ♀♀, + 2 juvs., doubtless the S. 135.5 group. Single ad. 100 yds. N. of 133.4. On S. 133 Flat, 15 ad. + 6 juvs., 12 ads. being close together + others 3 scattered 100 yds. away (prob. some ♀♀ with juvs. joined). Two with pregnant appearing, at km. 133, then 100 yds. S. of it (7:45), + I saw 3 more (+ 1 juv. near them). So, groups of 15 (6 juvs.) + 5 (1 juv.) on S. 133 Flat. One juv. with 15 stays with mother, 80 yds. from band, + other juvs. play together. 8 a.m., I on N. 133 Ridge. In Loop, at E. side of flat, 26 orcs (mostly young) being driven S. by one ad. ♂, the 26 across S. limb of Loop at 8:07. Pursuing ♂ then returned N. to 100 yds. S. of N. limb loop. N. of it, across stream, were 4 together. One only of 26 appeared to be fully adult - it was across stream before others crossed (not with them? - former ♂ of 12 here?). This ♂ has carpus slightly truncated + has same left hind leg. It is probable that ♂ injured + thus lost its ♀♀ which joined adjacent bands, + now ♂ of group to N. of Loop is appropriating the loop flat (N. 133 Loop Flat). One pregn. ♀ of group N. of Loop holds tail a little out. Injured ♂ - ankle gives sideways when weight on. This ♂ rolled in 4" 1 ft. high to a bush. Pushed neck along, driving with hind legs, then rolled on side on bush, rolled over dorsally. 8:20, the 4 crossed stream to near ♂ (of 5 N. of Loop); now in favored former Territory of the 12. About 9 of 26 remained N. of S. limb of Loop, + at 8:30 the ♂ of 5 came 250 yds. + drove them 30 yds. S. to within 100' of S. limb. I walked up hill W. of N. 133 Ridge. I was 300 yds. from the 26; alarm given + they

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moved 100 yds. N. onto Loop Flat. The 5, 500 yds. from me, fled to W. up to top of barren ridge & on. The 15, 500 yds. from me, walked S. to 700 yds. from me. The ♂♂, notably, stayed ^{on} Loop Flat until I, 300 yds. away, shot 22 at a bird, whereupon ♂ group ran N. (9:10). 9:30, 7 ad. + 2 juvs. at stream at 136.2, one ad. in water grazing bank. || 10:40, about 200 ♂♂ in E. 137 Draw. These gone about 11 a.m. 11:30, they were ^{stream} across from 137.8. 12 M., across stream from 138.2. ♂ of ♂ + 3 yrl. chased them across E. 138.2 Draw, then ♂ of E. 138.2 Draw 5 came 200 down draw & chased the group N. (along W. slope of Rocky Hill. 11:45, 5A + 3 juv. ^{lying} away rocks on slopes of S. side of E. 139 Draw (the 6A + 5 probably). Both ♂♂ (138.2) returned to their ♀♀ a few min. after chasing the group of young ♂♂. || 12 M., the 7 + 2 juvs. 80 yds. NW of road at 136.05 || 5:39 2 ad. 100 yds. SE of 137.2. 5:45, 5 ad. + 3 juvs. across stream from 139 (lost 1 ad. + juv.?). Three ad. in W. 139 Draw. 5 on SE. 138 Draw Flat. Full moon tonight.

March 11, 1952. Left camp (km. 137) 5:55 & drove to 139. Sunrise 5:50 at camp. 6 a.m., 5 still prone in shadow on slope S. of S. 138 Flat. These up at 6:20 after in sun. ♂ prone & 3 yrl. up, in sun 6 a.m., 80 yds. NW of 138. Frost on branches. A group of 5 or 6, with 1 juv., on W. 137.7 Bank, 6 a.m. (the 7 ad.?). 2 up W. 138.6 Draw, 200 yds. from road, 1 prone still at 6:05. 6:10, 3 (entire herd) ad. grazing in W. 139 Draw, at foot; 2 pregn. ♀♀ & 1 ♂, apparently. 6:10, about 30 ♂♂ in band coming N. along ridge top to E. 139 Draw. The W. 139.3 group, at least 4 still prone on slope in grass, above head of W. 139.3 Draw, 300 yds. from stream. ♂ chasing ^{after} some hidden. A juv. nursing 6:10. 6:20, 1 was

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at 138.3. The ♂ + 3 yrl. having visit from one ad. of 4 about 100 yds. to W. (part of 7?). 6:35, one ad. slope ridge NW of 137.3. 6:45, 2 ad. + a juv. walked up W. 137.5 Draw then to N. across slopes above W. 137.7 Bend, north + juv. leading. The 4 ad. had at least 1 pregn. ♀; they grazed 100 yds. NW of 137.9 (the 7 split up?). Same 6:55; no mounting attempts. ↓ to 139. St. shorter LE ♂ at 138.95, 50 yds. to SE road, looking across at ♂ group across stream. 4, apparently ♂ + 3 ♀ (at least 2 pregn.) 50 yds. W. of 139.05, but shorter LE ♂ did not molest them (7:10). 7:15, in W. 139.3 Draw, 8 ad. + 2 juv. Upstream from there, opposite 139.8, 7 ad., 1 yrl., + 4 juvs. near stream, the juvs. together 100' from adults. || 7:45, the group stayed in W. 139.3 Draw in spite of men working on truck 200 yds. away, on road. 7:50, 58 ♂ across from 138.8. || 8 a.m., 7 ad. 100 yds. NW of 137.8, one prone. 8:05, two ad. 50 yds. SE road at 137.3. 7 ad. + 2 juvs., all but 3 ads. prone, among rocks + Festuca on SW ridge of E. 137 Draw (8:15). Ad. + 2 yrl. (or 2 yr. olds) in E. 137.5 Draw. || 9:50, 17 ad. + 3 juvs. 100 yds. S. of 135.1 on Festuca flat near stream. 10:00, on S. 133 Flat, ^{+ 5 ad.} ~~15 + 3 juvs.~~ ^{14 + 5 juvs.} ~~15 + 5 juvs.~~ (15 + 6 j.?), + 5 + 1 juv. on W. side of flat. || 11 a.m., shot at hind km. 134.7, & the 17 + 3 ran across road + up barren hill to N. for 150 yds. ||

March 12, 1952. On road at 6:30 but fog limited visibility to 100 yds. Waited at 138.2 & the ♂ + yearlings came from W. 138.1 Draw at 7 a.m. & crossed road at 7:15 & grazed 80 yds. SE of 138.2. all 4 prone at 7:50. at 7:45, shorter LE ♂ + at least 1 other at foot W. 139 Draw. 5 ad. + 4 juvs. at stream below Brown Bridge. Still cold fog at 8 a.m. || Fog cleared 8:30. 8:45, 16 ad. + 4 juvs.

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March 12, 1952. Huaylarco, 15000', Dpto. Arequipa
 ascending barren ridge N. of 135.1; a truck stopped on road. at
 10:30, 17 ad. + 6 juvs. on S. side of S. 133 Flat. 4, Draw, on barren
 soil beyond green; there perhaps separate groups. 10:40, from top
 of N. 133 Ridge, I could find none in Loop area. Lone ad. 100 yds.
 SE of 133, 8. || 10:45, 6 ad. + 3 juv. on short green grass gentle slope at
 foot E S. 135.6 Draw. On ridge across stream from 136.4, 11 ad. + 3 juvs.
 (or more of each.).

March 14, 1952. Drove up road from 137 at 8 a.m. 2 ad. + 1 yrling
 50 yds. SE of 137.2. 7 ad. 100 yds. NW of 137.8. 5 on S. 138 Flat. 2 ad. in
 W. 139 Draw. 6 ad. + 4 juv. in E. 139 Draw. 70 cumulus 8 a.m. I
 examined corpse of youngish ♂ + faint upper ^{canine} ~~molars~~ just emerged,
 testis size of distal joint thumb. Km. 137.5, the 7 adults within 50 yds.
 NW of road, one prone slope mound each at roadside. 8:50, E. 137
 Draw, a group of 8 ad. + 5 juvs., & 100 yds. NE of them 7 ad. + 1 juv.
 (such group seen 4 p.m. yesterday across stream from 136.5, & 3 (ad. ♂
 + 2 yrlings - the E. 137.5 Draw group?) at crest of N. fork of this draw.
 Windy today from east. 8:58, 20 ♂♂ working N. to edge E. 137 Draw.
 3 ♀♀ appeared adult. ♂ of the 8A, 300 yds. away, came 50 yds. toward
 the 20, & ♂ of 3 (50 yds. SE of 137.5¹⁵) also about 50 yds. toward them.
 ♂ of 3 squealed while looking N, possibly at 5 (or 2?) near stream
 opposite 137.5. 9:10, the 8A 55 back into E. 137 Draw. ♂ ran to the 20 or 20,
 tail up, & drove them 50 yds. downstream. They started fleeing at 100'
 & ♂ stopped 20' from them. When 3 ♂ squealed, the 8 had stood quietly
 ears of all but 2 up, & looked upstream too. 8 or 8 drove 20 an-
 other 60 yds. downstream, then (9:18) returned 200 yds. to its
 ♀♀, running first half of the way. It squealed looking up S.
 fork of E. 137 Draw. 9:20, the ♂ or 2 working upstream again;

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9:21, ♂ of 8 toward them + some started away when ♂ 100 yds. distant. Then it chased the group 50' SW. 9:23, an ad. ♂, tail up, came down S. fork of E. 137 Draw. The ♀♀ + juvs. ran 100 yds. N. The ♂ ran back to its ♀♀, passing 10 yds. from other ♂. This ♂ then ran at the 20 ♂♂, chased them ^{rather} vigorously. Ran into brush, then after scattered individuals, + drove them 100 yds. farther downstream than ♂ + across stream (at 136.8). ♂ of 3 watched, then ran to near the 20 ♂♂, standing, tail up, 50' from them. Lone ♂ ran back into S. fork of E. 137 Draw. 3 ♂ chased the 20, then stood on SE side ^{a (the?)} stream, then chased the 20 another 50 yds. to SW (9:30). The lone ♂ to the 8 + driven off 80 yds. with throaty cries by 8 ♂, latter with tail up + chased one tail down. (The 7A5T long since into E. 137.5 Draw). 9:33, one from the vicinity of the 20 ♂♂ ran across creek + to crest hill SE of km. 137 + stood staring toward the 20. The 8A5T rounded hill NE of E. 137.5 Draw to near crest (9:37). Resident group of E. 137 Draw seems to stay up S. fork most of time (disturbed by our camp at lower levels). 8 ♂ squeals looking SW. when a horseman 600 yds. distant. The 8 ran over into E. 137.5 Draw (9:40).

// 10:00-10:15, drove 137 to 133 but saw none, including S. 133 Flat (horseman disturbed?). One ad. on hill at W. end of N. 133 Ridge, but none in loop area. // 11:10, at least 10 ads. + 4+ juvs. 1/4 mile S. of S. 133 Flat on barren appearing rolling hills, many lying down but some apparently grazing. // 1 p.m., the 20 ♂♂ near road at 136.5, + at stream at 136.9 at 4 p.m. 4 p.m., drove up road from 137. Two 100 yds. SE. of 137. 2 + one at stream opposite 137 (all in one gp. 3?). 7 ad. 50 yds. NW of 137.85. ♂ + 3 yrl. 100 yds. NW of 138.1. 5 in E. 138.2 Draw, at head of flat bottom. Adult (SLE)

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across stream from 138.3. 6 ad. + 4 juv. in E. 139 Draw, + 2 ad. 50 yds. E. of the ♂. 8 ad. + 4 juv. in N. fork of E. 139 Draw (4:20). 4:30, the W. 139.3 group had 7 ad. (incl. same ♂) + 2 juv., across from 139.4. Examined teeth of estimated 2 yr. old ♂ + found upper + lower "canines" emerged, lower not thru skin yet, but all about $\frac{3}{16}$ " long. Testis saved in Bouvier's; size of tip joint of forefinger. || 4:50, the W. 139.3 group higher on slope to W., on level area. 6 ad. + 4 juv. in E. 139 Draw. Two juv. in play fight; hitting necks, wrists, hinders, putting head or neck over other's neck or back; kicking back with one hind foot at one behind - same as ^{near} yearlings. Then all 4 in running chase up to 50 yds. from adults + back, several times, + ads. pay no attention. All juv. appear about same size + color. 5:05, a juv. nursed at R. side mother 1st 50 sec., then mother grazed + walked so juv. had displaced, then juv. walked 6' from mother + lay prone. The higher E. 139 group has 9 A 4 J. 2 ads. on S. rim of E. 139 Draw; displaced from bottom of draw. || 5:15, SLE ♂ up slope to road at 138.4. Still 5 on flat of E. 138.2 Draw. || 5:30, in upper S. fork of E. 137 Draw, at least 7 ad. + 3 juv. (8 + 4?). 3 ad. + 1 juv. ran to SE across road + stream at 138.4 at 5:40 p.m.

March 15, 1952. About 10:30, 6 ad. + 4 juv. 100 yds. W. of 139.2. 11 a.m., 16 ad. + 4 juv. 100 yds. NW of 134.5.

March 20, 1952 Mary watched + saw copulations in two groups, one lasting $\frac{1}{2}$ hr. or more. Copulation in group of 6 A 4 J east of 139 (how long after first birth? ^{25 days})

March 22, 1952 7:45 a.m., S. 133 Flat, 12 A 7 J, the juv. in one section. One one 100 yds. S. of 133. 5 A 1 J at road at

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132.9. I drove up road. Road crew at 135. 300 sheep + men + horses at corral opposite 136. 2. Doubtless groups scattered by people on road this morning. $\frac{1}{2}$ mile up draw N. of 137. 65, 7 ad. + 3 juvs. (the 7?). 5, no juvs., in E. 138. 2 Draw. 6 ad. + 4 juvs. in E. 139 Draw, + above fork of draw 9A 45. ~~10000' above~~. Last pregn. ♀ of the 6A holds tail a little out. 3 of 4 juvs. ran fast out + back to group ♀♀ about 6x for 50-80 yds., same one usually leading. Rose in toy? Stratus overcast (8:45). 9:05, the 4 juvs. together 100' from nearest adult, 2 prone + 2 grazing while standing. The 4 with 9A also stay together at edge groups. One of these juvs. has black wet mud on side + side neck - rolled or fell in mud. 9A moved 50 yds. down E. 139 Draw so closest of 9+6 only 50 yds. apart, the 2 ♂♂ closest. 2 juvs. in play fight reared + clashed, + one crossed forelegs around neck other; this hold broken in 2 sec. Putting of necks over others. Biting of wrists. 9:25, the ♂♂ only 50' apart, grazing ^{peaceably} ~~peaceably~~. By 9:30, all 4 juvs. of 6A prone in 5 yd. drain. area, 50 yds. from adults. 9:35, ad. groups 100±' apart, apparently 4 pregn. ♀♀ in 9A. No attempt by self or another to clean muddy juv. This juv. walked to the 4 juvs. of 6A. Some of the juvs. stood stiffly while inspecting it, + the ad. ♀♀ put noses to its back, head, + neck. The muddy one kept tail up + sometimes shield away from these nosings. Hardly little notice taken of it and ~~the~~ 6A juvs. went away the 9A. Usually not noticed but when too close to an ad., ad. sometimes choiced a few steps. 6, or even all 8, ran together at times. Their own mothers payed no attn. to fact that their juvs. were off in other groups (10 a.m.).

Vicuña

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|| 13A6 J at foot hill N. of hm. 134 (10:40). 5A15 in SW part of S. 133 Flat, the ♂ having encounter with ♂ of 14A 75. a lone one 100 yds. N. of 133.1.

March 23, 1952. 2" snow on ground. 7 a.m., one 100 yds. N. of 133. None on S. 133 Flat but large group with juvs. on rolling bare hills to S. of it. Drove up road. 4 going up W. 136.6 Draw. 7 ad. 50 yds. NW of 137.9. 3 yrl. + ad. at stream at 138.2, + 5 in E. 138.2 Draw. Two in E. 138.4 Draw. 7:40, 6A + 5 in B.B. Draw. 9A + 4J in N. fork of E. 139 Draw. 9A + 2J. at road + W. 139 Draw at 139. The shorter LE ♂ with them! Juvs. lay prone in snow. ♂ ran 100 yds. S. + looked down road; group looked + hunched + started moving away up + across slope. ♂ ran back to them + all up + across slope. 10 llamas, no men, came parallel to road + on up stream + to N. Another ♂ whistled at them at 100 yds. + fled. 3 yrl. ♂ + ♂ in W. 139.3 Draw. The W. 139.3 ♂, ^(as from injury of lid) then + with ^{fright} left eye half closed, allowed llamas to pass 100' from it as it grazed near 139.2. This ♂ distinguishable by band on side. Apparently injured + lost its entire troop to adjacent ♂. ♂ of 6A came to across stream from it (60 yds. away) (8:10). 8:15, a healthy ♂ 100' W. of 139.2. It to pile at 139.25 + defec., then ran tail up, to sick one + it away 50'. ♂ of 6A then chased sick one, + other chased it too, 50 yds. up ^{slope} ~~steeper~~ W. of 139.2. Then sick one ran to road at 139.3, 6A ♂ chasing. No contacts but pursuing one stood 30-50' from chased one, stiffly, tails up. 6 ♂ back to group in B.B. Draw (8:25); other ♂ followed sick one on slope rocky hill E. of 139.4. || 8:30, the 9A 2J, led by shorter LE ♂, 100 yds. up from road in W. 138.6 Draw! || At 7:30 a.m.

Virginia

March 23, 1952. Huaylarco, 15000; Dots. Araya
 (alone) the other SLEOT was near road at 138.4. || One of the 9A appears to be non-pregnant 2 yr. old. 8:45, ad. + yrl. in E. 138.4 Draw. Group of 3 about 300 yds. up E. 137.5 Draw. The 7 at Stream at 138. One strongly pregnant ♀, but 2 ♀♀ thin & not pregnant appearing (loss of young?). Walking SW toward head of S. Fork of E. 137 Draw, 7 ad. + 4 juv. 7 ad. + 2 juv. near stream to SE of 135.7. 16A + 6j. at foot of slope to NW of 134.7. The 2 groups on S. 133 Flat. Many of these groups not seen when going up road at 7 a.m. & have evidently descended from higher areas. || 1:25 p.m., 250 yds. S. of km. 133 post, 14 ad. + 7 juv. All ads. grazing; all juv. prone, in groups 3, 2, & 1 + 1. These on S. side of creek. The 5A15 about 500 yds. to SW, 50 yds. S. of same stream, 2 ads. prone. Same 1:40. Light rain; all overcast. From atop N. 133 Ridge, I saw 2 groups (or 1) on flat of N. 133 Canyon about 1000 yds. from road. 6A15 and 8A15, the groups 100 yds. apart. || 2 p.m., light snow; 4 ad. of 14 & all 5 of the 5 lay prone. Rose gradually after precip stopped 5 min. later. 2:15, apparent ♂ of 14 leaped 150 yds. to SW & d. + u. on pear pile. Three juv. ran 100 yds. from nearest ad. ♀ & wrestled together. ♂ ran then 300 yds. more toward the 5A15, faster when 100 yds. away. Juv. & adult moved away - to others of group - & 14 ♂ stopped 70 yds. short of nearest & soon grazed (2:20). 4 p.m., drove up road from 134. The 16A6 ♂ 100 yds. NW of 134.8. 7A25 on flat across stream from 135.6. 300± steps across stream from 136.3. 9A25 in W. 139 Draw, 6A45 across from 139. 2x a strange group & a group 7A5 J at foot E. 138.4 Draw.

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VirginiaMarch ~~24~~²⁵ 1952Huaylara, 13000', Dpto. Arequipa

Drove down road from 142 to 136, 3:30-4 p.m. Several Indian women + 200± sheep in 139 to 136 area. 3:55, 8 ad. + 2 juv. in W. 139 Draw, on the shorter L.E. one. 6 ad. + 4 juv., one pregn. ♀ still in group, in B.O. Draw. One juv. nuzzled 1 1/2 min. at R. side mother; mother nuzzled its flank as if for recognition. An ad. walking alongside juv. twice put muzzle to its head, ears back, as if fl. blowing, + juv. retreated. 4:15, snow from SW. Only 1 of 4 juv. lying down; + it rose.

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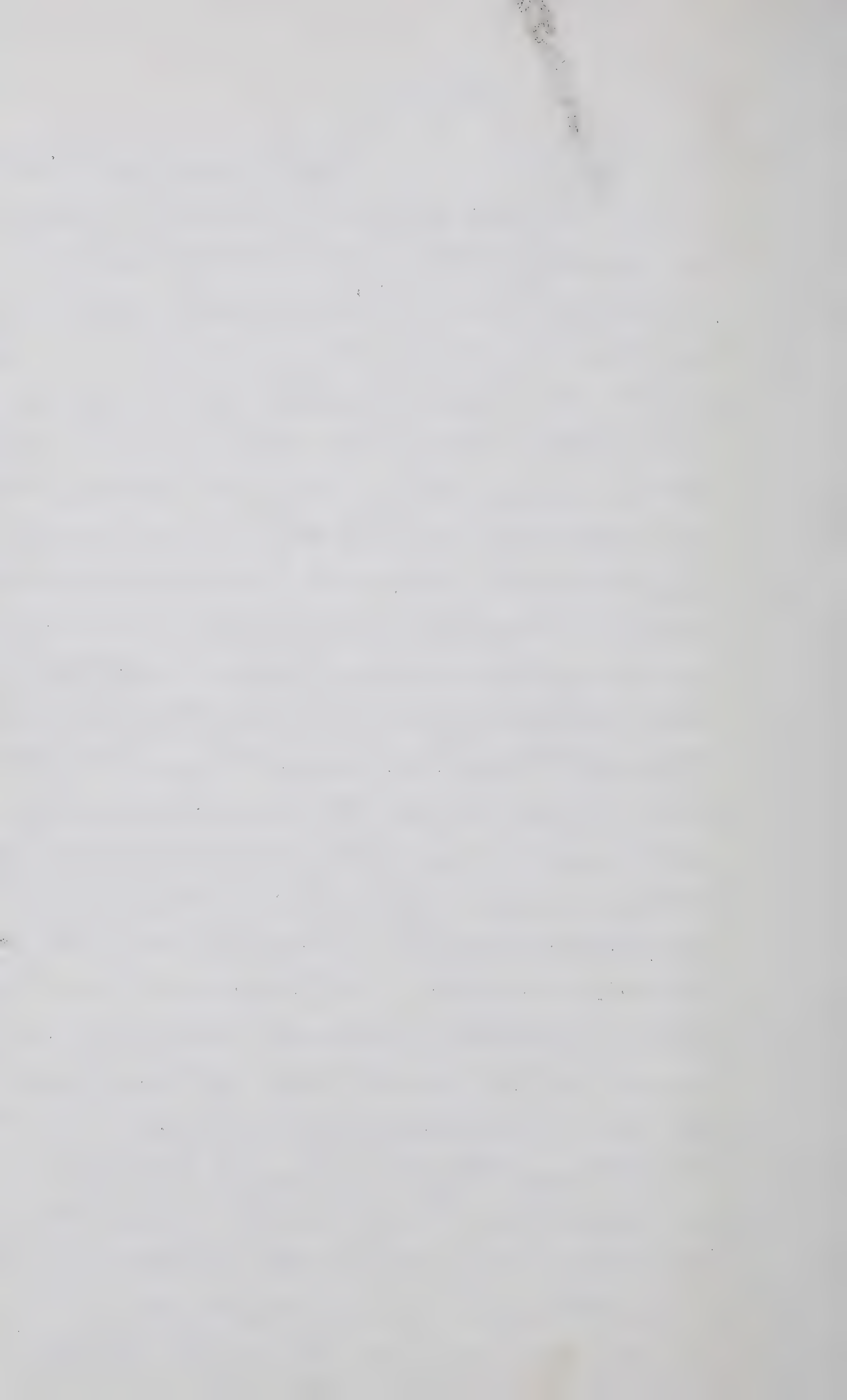
March ~~28~~²⁹ 1952. Overcast. 7:20, drove down road from km. 142. None seen above road camp, 139.5, about 400 to 7. 6A to 500 yds. E of Broken Bridge. Two juv. prone alongside each other; 2 50' toward ♀ + adults 100' beyond. Near fork of E. 139 Draw, 8 ad + 3 juv. (7:50). Two on slope opposite 138.9, 1 ad. + non-pregn. ♀. Adult approached from 100 yds. SW, tail up (♀). Ad ♂ ran to near it + stopped, + ♀ ran past + stopped 50' from ♂. ♂ to ♀ + put muzzle to its tail base. ♀ wagged tail fast + vigorously side to side + kicked back at ♂ with one hind foot. ^{ad ♀} ♂ to other ♀ which nuzzled it briefly. The ♀♀ grazed peacefully side by side + 100' from them (8:05 a.m.). 8:10, 8 ad + 4 juv. at stream at 138.5. ♂ tester large + protruding, + neck as wide as head in anterior view. It gaped at me nostrils held dilated, belly coming up (exhalation) when sound made. One ♀ ^{mother} with h. ear tip slit 2". ♂ followed group + herded it, near a bend, up slope to E. Ad. + yearling at stream at mouth E. 138.4 Draw. 5 L.E. ♂ alone, 50 yds. NW of 138.5; lay prone (8:20). Two in E. 38.2 Draw. In E. 37.5 Draw, 3, 1 or 2 young yearlings. 8:40, across stream from 135.55, 7 ad. + 2 juv. 1 then fled SE up rocky slope of last, apparently alarmed by 2 sheep dogs near

Vicuona

March ²⁹ 28 1952

Huaylarco, 15000', Dpto. Arequipa

km 136. 200 yds N. of 134.5, 1 ad. + 6 juvs. on flat. Single ad. 100 yds N. of 133.4. 9:25, S. 133 Flat, 10 ad + 7 juvs., + 200 yds. SW of them 5 ad. + 1 juv., all at S. side of flat grass area. From km. 131 - 26, saw on gravelly pampa groups of 4 AIT, 5 AIT, 8 AIT, + 4 A. Returning, 12:30, group of 4 ^(0 juv.) AIT 200[±] yds. NW of 126 1/4. 1 p.m., km. 133, 13A 7J 300 yds. to S., + 5A 1J 100 yds. W. of them. 1:20, 12A 6J at foot of hills NW of 134. 1:35, ad. + 3 yrl. 100 yds. NW of 138.1. 1:40, mouth E. 138. 28 saw, ad. + 4 100' distant. ♂ has light line on side as former ♂ at 139.3. The 4 were 3 yearlings + older one, latter with black mark on R. side of neck (und?). The 4 probably ♂♂. 2:18, ♂ + 3 yrl. to stream at 138.3, across + drove the 4 to SW side of E. 138. 2 tributary, then across + chased them 50' farther, not very aggressively. Light sided ♂ showed no interest + remained ⁷⁵ _{stream} ⁴⁰⁰, 200 yds from the 4 who went SW onto S. 138 Flat. 2:30, 9A + 2J at NW side road at 138.7, working up slope. 2:39, one juv. moved 1 1/2 min. ^{shorter} SLE ♂ follows bunch to head W. 138.6 Draw. Then grazing 200 yds. from road 3 p.m. Two, apparently ad. ♂ + 2 yr. (?) ♀, not pregnant, on slope across from 138.8 (where 3 this morning). 6A 4J at foot E. 139 Draw, 8A 3J near fork this draw. Pregn. ♀ of 6 holds tail out 2", a juv. kicks back with both hind feet at on chasing it. A juv. nurses 1 1/2 min. at R. side ad. The 8A 3J moved down draw, 6A 4J up, so groups 100 yds apart at 3:30, the nearest members 100' apart. One of 3 juvs. to the 4, then the 4 ^{over} goes to 8A group with the 3 juvs., one paying



Vicugna

March ²⁹~~28~~, 1952 Hwy (area 15000) Dpts. Arequipa
 no attr. to mixing of juvs. Juvs wrestle + chase, at xx
 all 7 running fast together. 3:45, juvs. with own
 groups. ♂ of 6 stays close to ♀; closer than to own
 ♀♀. All 4 juvs. prone, 3:55. Main gpc. 150 yds. apart 4 pm.
 Overcast, dark; fair wind. Snow later.

March ³⁰~~29~~, 1952. 1:20, left km. 142 + drove down road. The group
 in N. fork of E. 139 Draw. Two on slope across from 138.8; ad. ♂ +
 ♀ with white tip on ear. Two (1 or 2 ad.) in E. 138.2 Draw. One moved from
 pile + gave wolf howl; repeated. 1:40, they walked up draw to NE of
 tributary + on up draw out of sight (not residents?). Probably disturbed
 since from same train earlier today. 4/10 cumulus. 1:50, 200 yds. NW of
 138.1, 7 + 15, one a small yearling + another larger yrl. or 2 yr. old, these 2
 not pregn. + only one heavily pregnant. Ad. in rear moved pile + gave
 "wolf howl." Their group across stream at 137.9, then to S. across S. 133
 Flat + up rocky hill beyond (unknown group?). Ad. ♂ came SE across
 road at 138 + looked after the departing gp., 3 yearlings to road behind
 ♂. The 4 to stream at 137.9. 2:05, km. 137.7, the ♂ with light line on
 side. 2:30, on S. 133 Flat, large group with 17A 95, about largest ♂-♀
 group ever seen, 500 yds. from road, + 300 yds. SW of them 5A 10. also
 on green flat. 2:40, atop N. 133 Ridge, groups of 4 10A 30 above large
 in stream. None in loop. 2:50, one (ad. ♂?) 100 yds. S. of 132.9, alone,
 with immobile L. foreleg, limping badly but feeding. 11A 65 near
 edge lake, 400 yds. S. of 133.5 (3 p.m.). I watched S. 133 Flat from
 a hill near road. 3:05, the 11 to top hill leading to S. 133 Flat. ♂
 of 17 ran thru own group + 300 yds. beyond to top of this
 low bare hill. The 2 ♂♂ stood several yds. apart, tails
 up. The 11 retreated. ♂ of 17 atop hill alone 3:20, running

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March ~~29~~ 1952.

Hay/area 15000; Dpto. Areguayas

back to group ^{3:25} 4. It went clear to W. end group, nearest the adjacent group 5, + several there turned back to E. as if herded by ♂ at a short distance. Some ad. ♀♀ held tail vertical + looked at ♂ as it ran by. 3:35, the 17 moved 100 yds. ^N + became more bunched - all in 50 yds. diam. - perhaps due to ♂ of 5 which approached to 100 yds. Its gp. 100 yds. beyond. Of 17 gp., 1 ad. + 6 juvs. prone on flat 3:40. Fair W. wind; 9/10 cu-struction + dark. 17 ♂ to 50' from 5 ♂, then ran back to edge its own gp. 3:47, ♂ of 5 ran into the 17 + then them, then turned back as 17 ♂ showed it. They chased in 100 yds. 0, then straight + fast, 10-30' apart, 1/4 mile to road + across at 133.1, then 100 yds. beyond, cut about, + finally 5 ♂ stopped. 17 ♂ turned + ran straight back to its ♀♀, + 5 ♂ finally started back so that only 200 yds. behind 17 ♂. 17 ♂ back 3:52. Other to 100' from its nearest ♀ + grazed. 3:55, 7 of 9 juvs. prone; no results. 4:05, 8 of the 9 juvs. prone, 7 in a group separate from adults. Same 4:15 4:20 lone crippled ♂ prone 100 yds. N. of 132.0. Drove up road. 4:30 2 ad. 100 yds. S. NW of 136.9; the 137.2 pair? 7 ad. (0 juv.) 200 yds. W. of 137.7. One ad. (light band on side?) at mouth E. 137.5 Draw. One ad., appearing ill, 50 yds. SW of mouth E. 138.2 tributary (4:45). 4:50, 2 ad. in W. 138.6 Draw (who?). 4:55, 0430 200 yds. E. of stream in E. 139.8 Draw. 6A 45 at foot B.B. Draw.

April 3, 1952. at 2 p.m., 6A 45 in lower E. 139 Draw, + 5A 10. (no short-eared ♂) in W. 139 Draw. at 3:25 returned to 139 + saw 6A 45 in Broken Bridge Draw. 300± sheep were near him. 138 being driven downstream. 3:30, 30± ♂ came S. over hill E. of 139.3 + ♂ gave chase + remained out of sight of ♀♀. 3:36, two juvs. moved

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Huaylarco, 15000', Depto. Arequipa

at L. sides mothers $1\frac{1}{4}$ to $1\frac{3}{4}$ min. One then to pile & urinated, other lay prone, then first prone. The other 2 juvs. grazed (3:40).

$\frac{7}{10}$ cumulus & fair wind from W. 3:44, one nursed L. side mother 1 min. or +. A min. later urin. on pile, then wrestled necks briefly with another juv., then lay prone with other 2 (3:47). 3:50, ♂ coming down from top draw. Pregn. ♀ holds tail out Π most of X. Fourth juv. prone ^{3:51.} Nursing broken off by mother grazing & walking away, juv. making little or no attempt to resume. At least 1 prone juv. shows cud. The 4 juvs. in 20' space, 50' from nearest adult. Pregn. ♀ gets to feet heavily after rolling. One prone juv. rests chin on clumps grass, neck extended. 4:05, ♂ has not come within 100' of ♀♀. 4:06, first 2 juvs. to lie prone rose; one prone again; other to feces pile, urinated, to ad. ♀♀, rolled. Another juv. joined it. They grazed among ad. ♀♀. Juvs. all urinate fairly erect, as ♂ or ♂. 4:14, ♂ looked at two strange ones atop hill to W.; 2 prone juvs. up & ran to group. ♂ ran 100' W., d. & ur. on 2 piles 20' apart, ran 50 yds. more uphill & stopped. ♂ then ran 100 yds. SE toward 2, 200 yds. from group, atop ridge. The 2 saw ♂ & ran off to S. 4:18, 2 juvs. prone; another trying to nurse - no success. 4:20, ♂ back to group. 4:30, an ad. ♀ d. & ur. on pile, & 2 juvs. ran up to her rear. Then one worked feet on pile & def. a single small blob. The same 2 juvs. still prone (4:30). Two ads. graze on short graminoid at edge large feces pile. A juv. next to a mother which put its hd. to juv. & juv. jumped away. 4:55, the group 50 yds. down draw in last hour. Pregn. ♀ d. & ur. on pile. All 4 juvs. (the 2 up) ran to this pile & 2 or 3 urinated. (Note 2 grazing ad. ♀♀ 4' apart, one spit at other which ^{held head} turned head away, both with ears back & below horizontal &

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Huaylarq 15000; Dotor Areguipa

draw somewhat together for $\frac{1}{2}$ min.; then spitter walked away. Other, a mother, was nursed $\frac{1}{2}$ a min. later for 2 min. Two juvs. in play fight. One car. one jumped up like a horse bucking. Group started working uphill in the draw. 5:10, chasing among the 4 juvs. & fights. Rear up & dash, entangling forelegs, or one getting forelegs over other's shoulders. Kick back hard with (or both) hind feet at pursuers. Put neck over other & raise forelegs as if to bear other down. The adults worked up slope going NW. 5:25, the juvs. had calmed down & joined adults. One nursed at L. side mother; she moved to rears. 3 which had been on slope across stream from 138.8 since 4 a.m. were opposite 138.9. A group of 20 \pm , prob. 5 or 7, 300 yds. upstream from Broken Bridge. Wind continued; 8/10 thin stratus. 5:39 another juv. nursed. The group to old road 50 yds. NE of B.B. The 4 juvs. road to stream & back, then 100 yds. upstream (where 300 or so) & back. The 5 or group came downstream. The 5 f & juvs. fled to 50 yds. E. of B.B., & 5 of 6 drove the 30 \pm up W. 139.3 Draw. 5:40, one juv. nursed. Some juvs. & others d & f or ur. Getting dark. 5:44, group crossed stream, none drinking, & went up slope to W. of 139.2, & the 5 or joined them from the rear. 5:48, about 150 yds. W. of road.

April 4, 1952. Stratus overcast, not freezing. 5:30 a.m., drove up road from 137. 5 f & 3 juvs. 100 yds. NW road at 137.9, all prone, 5 or 50' from the f & (together, within 10'). Saw one up at 5:40. 5:45, 8 A & 5 prone & 1 ad. up in N. fork of E. 139 Draw, on W. facing slope. The juvs. were each alongside an adult. Group spread 100'. I went up slope W. of 139.2 where 6 A & 5 went last evening. They were all up,

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Huaylarco, 15000', Depto. Arequipa

300 yds. W. of road, on green flat above rocky slope. Seeing me, they ran down W. 139 Draw & to across stream from 139, in usual grazing area. 5 ad. ad up at 5:50 in W. 139 Draw; there went up E. 139 Draw about 6 a.m. By 6 a.m., nearly all vicuñas up. Overcast obscured sun. I drove back to 138. ♂ + 3 yrl. grazed 100 yds. to NW. Across stream from 138-3, a ♂, mouth constantly agape, body wet as with sweat, & blood at side of neck (fight?) walked 10 yds. behind an unruffled ♀. ♀ had depression in hair just ant. to shoulder as if ♂ had copulated & leaved there. The 2 moved creek at 138, road at 137.9, & ♂ ran 100' toward out of 4, the 2 stopping 50 yds. apart. The ♂ paid no apparent atten. to accompanying ♀. ♂ ran a few yds. at a lone yearling in vicinity. ♂ + ♀^Q off to NW of 137.9 walking, 6:25. I returned to 139. The E. 139 group + B.B. group^{9A45}, ^{about} as before. 8A25 at head of W. 139 Draw at 6:10 had descended somewhat. ♂ chased off & bypassing 1 (the shorter LE ♂). An ad. ran from near this group to E.; ♂ of 6 came to stream to meet it, then chased it thru its group & gave up chase at ridge of N. fork of E. 139 Draw. The 8A25 descended to edge road at 139.1 (7 a.m.) // at 6:10, 2 ad. in W. 139.3 Draw, one having pale stripe on side - former resident ♂? // 7:10, ♂ first, most of the 8A25 crossed to E side road at 139.1. 7:20, all back to NW side, ♂ last. Only one of the 8 surely pregnant, (should be 5 for 100% ^{3 or 4 others possibly} another juv. 7:28 ^{efficient} reproduction. 7:25, 1 ad. & 2 juvs. (of 6A45) prone; overcast, fair breeze. 7:30, 2 juvs. of W. 139 group prone. First ^{direct} sunshine of day 7:35. 30± ♂ + ♀ which apparently spent night 1/2 mile N. of Broken Bridge on sidehill, now at stream opposite 139.5. 7:40, 2 ♂ of 8A & 3 of 6A still prone. The prone ad. of 6A ^{is} ~~not~~ ~~in~~ the pregnant one, & is 100 yds. up slope from other ads. 7:48, it

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Huaylarco, 15000 ft., Depto. Arequipa

rose & walked down slope to 100' from other ads. The 3 Juv. also up. 2 ♀ of 8A wandered 100 yds. up & across slope from group; ♂ walked to near her & soon both returned to group at foot slope. 7:57, pregn. ♀ of 6A spreads legs on fence rail; it joined other ♀♀. One juv. nurses, L. side, 7:57. 7:58, ad. ♀, & still 2 juvs., of 8A prone. 8:07, 2 juvs. of 8A up. One nurses. A second ad. prone. ♂ to pile, nose it, dips. - ♂ has made 4 visits to piles since any of ^{7 ad} ♀♀ seen to do so. 8:10, a 3rd. of 8A prone; 7/10 struts, no nursing. ♂ of 8A has more prominent neck glands than any others. I moved to 139.4. ♂ group had 31, at road at 139.4; at least half yearlings, & only ^{4 or 5} ~~two~~ appeared fully adult. The two ad. at foot W. 139.3 Draw may be both ♂♂. One with light line on side rather thin, neck glands prominent, & a few tufts hair pulled out. Other in good clean shape; it lies down prone often. Once it lay prone, light-side below at it, & first rose. Once it started to defecate but left pile as light-side drew near. 8:30, ♂ herd went E. across road. One drank in roadside trickle. The two, never over 30' apart, grazed to W. 139.30 Draw. One drank in puddle in grass. Then they worked upstream again. 9:02, reached stream at 139.5 & worked back S again. By 9:20 they had moved S. & N. & S about 100 yds., light-sided one (a definite ♂ with protruding testes) following movements of other. Unable to definitely sex other. || 9:35, the 31 ♂♂ 50 to 100 yds. E. of 139.5, || lying down. 9:45, 8A 2 Juv in W. 139 Draw, 6A 4 Juv in E 139 Draw, 9A 4 Juv in N. ^{fork} ~~fork~~ latter draw. North E. 138.40 Draw, ad. & yrl. prone 100' apart, the 5 L E ♂ 100' on opposite side of yrling. The E. 138.2 Draw group apparently disbanded. An ad. ♂ with 2 gr. (?) ^{& another} old & yrling near stream at 137.9. The yrl. lay prone in water

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Huaylarco, 15000; Depto. Arequipa

2"-6" deep for 10-15 sec. at least 3 times, in usual way, then
 rose & shook. Neck glands visible. A truck passed; yrl. + another
 stayed by stream & 2 crossed to NW side road in front truck. 10:10, ad.
 ♂ + 2 yrl. 100 yds. E. of stream at mound 137.5 Draw. // 1:30, 10 ♂♂,
 none adult or juv., 50 yds. S. of km. 135. One 100 yds. N. of 133.2.
 None on S. 133 Flat but a few alpacas there. 2:30, the 10 ♂♂
 as before. An adult with juv. ran to W. along foot of hills
 near them. // 4 p.m., drove up road from 137. 200 yds. NW of
 137.6, 7 with no juvs., only 1 ad. surely late pregnant. Apparent ♂
 only one prone & apparently cut on lower R. neck (the one seen this morn-
 ing?). 4:15, same 2 ad. in ^{W.} E. 139.3 Draw. I stopped 50 yds. from
 them in car & they moved to 150 yds. away, light-sided one behind
 somewhat & 10' to side other. 4:20, 6A & 5 came down B.B. Draw from
 ridge at top. ♂ + one ♀ went 150 yds. S. of group along side of rocky
 ridge. 4:35, 3 juvs. of 6A prone. A ♀ ran slowly 200 yds. to S. of
 group. ♂ ran after & stood 50' from it, looking about, then ran
 back to group followed by the ♀ (I?) (means?). ♂ chased
 another ♀ a few steps when back at group. 4:45, only 1 juv.
 lying down. 3 at 4:50. Same ♀ grazed 50 yds. S. group, then slowly
 ran to 200 yds. S. to N. fork of E. 139 Draw. ♂ after at slow run when
 ♀ 100 yds. away, & (4:53) the 2 ran slowly back toward group,
 ♀ leading by 20 yds., & the 2 grazed 80 yds. S. of group (this the pregn.
 ♀?). 4:56, all + juvs. prone; 2 6' apart in file, other 2 separate juvs.
 chewed & chew at ground; do not doze as very young ones do. One
 juv. up 5:03; others 5:10. ^{One nursed.} 5:10, one, apparently same ♀, ran off
 to 150 yds. S. of others & grazed, & ♂ ran halfway to it & grazed.
 The main group to stream opposite 139.2. 5:19, ♀ came back

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Huaylaric 15000' Opito, Arequipa
 to near σ . Snows lightly. Same σ off 50 yds. to S. there,
 then runs N. Hallow sides sled. - lost juv. ? Then to 100
 yds. NE group + grazes; then back closer to group. 5:25, snow
 increases, windblown from SW. Group runs to foot of B.P. Draw
 & some lie prone facing σ downwind. Juv. prone beside ad. 2
 juvs. nursed simultaneously. 5:29, two ads. still up; all
 others down, each juv. alongside & parallel to an adult, no pair
 closer than 10' to another. Snow whitens backs & hind necks.
 5:49, at least 6 on W. 137.7 Draw (300 yds. W. 137.7).

April 5, 1952. More snow at night so 1" on ground. Clear at 5:20 a.m.
 drove up road from 137. The 6 (at) on slope of W. 137.7 Draw,
 50 yds. from where seen last evening, all prone. 5:25, the B.B. group
 at head, almost on ridge, of B.B. Draw. One, snow on back, graz-
 ed in lower E. 134 Draw. 9A4T prone in snow of ^{NE} ~~NE~~-facing
 slope of N. fork of E. 134 Draw - as yesterday morning - spread
 100'. About 141, 5A15 prone in snow on a E. slope. Juv. parallel
 & next to ad. but facing opposite; snow on all backs & necks.
 Scattered 30', various orientations. || 10:12, snow gone; hum. 139.7,
 light-sided ad. on road side stream; other ad. 50 yds. distant & across,
 prone among grass clumps. Prone one chews up to 35 cores. X in chew-
 ing cud. 10:23, prone one up. σ joined it & both to foot W. 139.3 Draw
 where first noted & σ defec. briefly on a pile. 300 \pm sheep 1/4 mile
 W. of 134.5. || 10:30, 4 ad. (one perh. 2 yr. old) + 10. at road at 138.
 9; to ^{W.} up slope. 6A4T across stream from 139.1 (no pregn.
 ♀ - I think had young yesterday & lost it). The group at fork
 of E. 139 Draw now 14A5T, 2 σ + 2 ♀ late pregnant. 10:45, all
 4 juvs. of 6A lying down, 3 prone & 1 on side. All up 10:55. || 11:05,

Vicugna

April 5, 1952.

Huaylarig 15000; Dpto. Arequipa

8A45, at least 2 ad. ♀ late pregnant, on rocky slope across stream from 137.8. || 11:50 a.m., 7 8A45 at foot of E. 137 Draw 12:10, two on NW side stream at 137.1. One, tail up, to edge stream, & one of 7 (prob. ♂) to edge on SE side. The 2 + 7 now grazed peacefully on opposite sides stream.

p.m.

April 6, 1952. at 3:20 I drove down road from 137. Flock sheep at 137. No vicuñas seen until N. of 134.4 I saw group of 13 A65 on flat at foot of hills. Several pregnant ♀♀. Near middle of SW side of S. 133 Flat, 5A15 as before. Crossing pampa & then going S. on low ridge at SE end of S. 133 Flat, 13A85. ♂, tail slightly out, ~~ran~~ pranced back & forth along graze as if herding them along. ♂, behind graze, d. on pile, gave wolf haul. at another pile, 6' from def + ur. ♀, ♂ gave 2 wolf hauls. 3:55, group herding SW on barren low hills, ♂ behind & herding. Two juvs. nursed; ♂ toward one & nursing broken off as mother moved away. ♀ without juv. leads walking group. By 4:05, the group walking across barren hills to SW still, 1/2 mile from where at 3:45. I suppose may go to hills (vegetated) beyond the barren ones for night. One mother stops & lets juv. nurse, then catches up with group. 4:08, all over last barren ridge before greener hills beyond. The 5A15 include non-pregnant (or 2 yr. old & at least 1 (of 2 possible) pregn. ♀. 4:25, 13A65 at foot hills to N. opposite 134 & a lone ad. (prob. ♂) 200 yds. SW of them. 4:45, 7 ad. just over hill (300 yds. NW) from 137.9. On S. 138 Flat, ad. + 3 others (seemed 2-2 yrs. & 1-1 yr. old) (the former 5?). 13, 2 fighting & no juvs., on NE side of E. 138.2 Draw. 4:55, 5 ad. & a ♀ juv. in W. 139 Draw, the SLE ♂ 100 yds. NW of them stop slope,

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April 6, 1952.

Huaylarig 15000; Pato. Arquipia

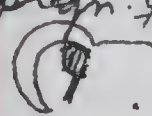
driving to N. a bunch 16 ♂♂ (this group has decreased by 2 ads + 1 juv. last few days). 6A45 50 yds. E. of Broken Bridge. ^{group of} ~~at least~~ 10 A43J in N. fork of E. 139 Draw. Juv. running together. One jumped straight up in air in running, fell over a 6' dirt bank, turned over, + up + ran again. 5:15 ♂ down slope 100 yds. N. of ♀♀ + they soon walked to near it (5:10). Same 5:20. 5:25, 5 in foot SW Branch of E. 138.2 Draw, 2 apparently ad., other 1 or 2 yrs. old.

April 7, 1952. 8:40 a.m., drove up road from 137. Groups of 1 + 6 ♂♂ 100 yds. NW of 137.4 + 137.6. 7 ad. 100 yds. NW of 137.8. Ad. + 3 yrl. 100 yds. NW of 138. 5 (3 or 4 young, i.e. 1 or 2 yrs. old) at edge (N) of S. 138 Flat. a dog at stream at 137.6 + no vicuñas there to 139. 3A15 50 yds. W. of Broken Bridge. The light colored ♂, alone, 100 yds. W. of 139. ♀. Here is ♂ which lost ♀♀ but stays in same territory. I watched condors but saw none descend. Back down road. 138, the ad. + 3 yrl. 50 yds. N. road. 137.8 ad. + 4 1 or 2 yr. olds 50 yds. SE road (crossed from S. 133 Flat?). 9:40, km. 134.9, group of 13A6J 100 yds. to S.; 3 ♀♀ appear pregnant. ♂ 150 yds. E. of ♀♀. A few ♀♀ rolled on loose soil. They wandered to north S. 134.7 Draw. a juv. mired (9:50). Two juv. ran to ♂, then retreated 10⁺ yds. + ♂ walked past them, then ran 50 yds. to pile ^{just} where ♀♀ had d. + u., roared twice + gave "wolf howl;" repeated. 10:02 ♂ prone. All others were up, some juv. wrestling. 10:03, a pregn. ♀ prone, then lay on side, head on ground. 10:05, 2 more ♀♀ lay down. 10 cloudy. 7 ad. down by 10:06. 9 down 10:08, + a juv. nursing. Only 6 ad. down 10:09. 10:11, only ♂ + 1 other down, others walking W. along foot of hills. all up 10:12. By 10:25, the groups at foot hills S. of 139.6. ♂ followed; roared twice 20 sec. but did not d. or u. One

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Huaylorco 15000; Dpto. Arica

pregn. ♀ holds tail arched, naked anal skin ballooned below it . It seems to have another neck gland above middle of neck, or series is higher than in ♂ - perhaps thinner neck like depression at side of throat show. Two poked heads under & between boulders to get 8" long greenery. 10:44, ^{ad. ♀♀} + crossed road to N. side at 134.5, none accompanied by juvs. By 10:55, 7 ad. + 3 juvs. across road. A juv. followed ad., tail up, + ad. stopped + let juv. move at R. side. Ad. put nose near belly + flank juv. as if to identify. Two juvs. lay ^{down} ~~prone~~ 11:07, a group of 6 running toward the 13, 50 yds. N. of 134.2. ♂ of 13 immediately ran to near them, tail up, + stood on a mound; then herded the 6 to ^{NW.} SE 11:11, ♂ chased group to SE across road at 134.2. One juv. lay prone in road center. 11:18, ♂ returned down the hill S. of 134.4, running to group + a ♀ running away from it. Only 1 juv. still down - 2 by 11:20. 11:25, I drove down road. all crossed to N. side ahead of me + ran 70+ yds. from road. None on S. 133 F lat but a large group (at least 2455) on lower hills opposite 132.5 + 1/2 mile distant. F ran tops of N. 13 ridge, now visible in N. 133 canyon. // 1:05, 13A6 ♂ grazing 100 yds. N. of km. 134. // 2:20, drove up road from 137. Ad. + 2 yd. at mouth E. 137.5 Draw. Ad. + 3(?) in W. 138.1 Draw. 5 in SW branch of E. 138.2 Draw. at mouth E. 138.4 Draw, 9A6 ♂, apparently out of territory. 2 juvs. prone, + 2 more at 2:46, a 5th. 2:47. Two ads. looked at goose which landed 20 yds. away. All juvs. down by 2:50. Then 4 up, + lost 2 when goose flew. 4 prone again in 2 min. 2:55, a juv. moved at L. side of adult. An ad. ♀ repulsed a nearly juv. by putting muzzle close to its head - blow? 5 juv. prone by 2:59; two almost touching. All 6 down 3 p.m.; all up 3:05. Juvs. put head under

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Huaylar ca. 15000; Pato. At aguis

mother's belly; she walked away; again, + permitted to suck - mother put her muzzle to bare tail juv., shook head, then to juv. belly, + shook head. 3:08, another juv. nursed. The group moved 50 yds. up draw. 3:18, 2 juv. lying down; up by 3:23 + one nursed. 3:25, I drove up road (men walking up). 6A15 in lower W. 138.6 Draw. A lounging ad. at stream at 138.6; rough scabby look to belly. 2 ads. + a yrl. (resident 3 prob.) across stream from 138.8. 3:30, 6A⁴⁵ #6 at S. side of ^{mouth} E. 139 tributary. An imm. ran downhill opposite 138.9; chased by ♂ of 6A, then ♂ of the 3. 11A45 on S. side of E. 139 Draw, 200 yds. E. of the 6A. The groups in E. 138.4 Draw gave after 4 men walked up road; others to 139 moved away slightly. Of 6A15, ^(tail slightly out) one ♀ pregnant. 4:34, ♂ (of 11A45) ran into group + chased one ♀ out, chased it back + forth along sidehill 100 yds. each side of main group, then back to E. side + the 2 stepped + grazed 100' apart. a juv. joined ♀. ♀ had often been close + seemed to push chest against its rear rather than trip it with head. A strange group of 7A15 descended from hill to W. of 139.1 + crossed to stream + grazed there. 3♀♀ in this 7 appear to be pregnant. These out of sight of ♂ of 6A45. Of the 11A45, 5 ad. appear pregnant. 4:07, 7 juv. played together (of 6A + 11A). Juv. tolerated to 5' from ♂; then began at. Apparent mother, 100' away, watches ^{is the} (this, chased one). 1107 to pile + def. 4:17, then grazed 50 yds. from nearest ♀. The chased ♀ ^{is} seems lame in right hind leg. 4:35, ♂ of 7A ran a few steps at a ♀ which then walked away, + whole group walked NE. ♂ of 6A saw + ran toward, + they ran when saw ♂ coming. 607 stood 100' from the 7A15 as latter walked to top rocky ridge E. of 139.2; then 607 back to own group. One pregn. ♀ of 11A holds tail a little out. Chased ♀

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Huaylarco, ~~192~~ 15000; Dpto. Arequipa

stays 100 yds. from group - perhaps not welcome. 4:50, the 6A + 11A 150 yds. apart; 6 juvs. with the 6A. The lame [♀] started away to S. ♂ of 10A gave chase & she ran, her juv. 50 yds. behind, & ♂ stopped chasing atop ridge SE of 138.8. ♂ breasted off & chased 2 others then. Meanwhile 99 of big group moved closer to 6A. ♂ of 6 gave chase & chased one individual out & back to group, then another. Juvs. followed chased mother, often behind chasing ♂. 6 ♂ then back to own group as 10 ♂ returned. 10A 35 then to top of ^{slope} ~~S. side~~ at S. side of E. 139 Draw & grazed (5 p.m.). 5:08, 35 of the 6A prone; other moved, then prone. Sunset shadow on there at 5:15. 5:22, juvs. of 6A up & on nursing. ^{Two} One ad. of 10 prone on slope. Sun has set on peaks. 2 juvs. of 10A join 4 ♂ of the 6A, 3rd. ♂ nursing. ♂ of 10A ran up N. for E. 139 Draw about 5:15, then returned to 100 yds. E. of 99 & grazed on sidehill. 5:30, juvs. play - sometimes 7 in a chase after leader; chase often split into 2 or 3 races. Adults look & poke muzzles at close juvs.; or, rarely, run a few steps at one. Two of 10A stay prone. One up 5:35. Two down 5:37 & still at 5:50. The 10A spread 100 yds. NE of the prone ones. 6A 200 yds. to N. of them. The ^{7 juvs.} ~~juvs.~~ scattered, grazing, near the 10A. 2 of the 3 on slope SE of 138.8 were prone, 100' apart. 5:55, 6A 15 at W. edge road at 138.9. Only 1 of 10A prone. Obs. getting difficult because of dark. Moon showing thru corner clouds about 1 day short of full. 3 of 10A prone. Some juvs. still playing c. 10.m. Planets visible.

April 8, 1952. ^{a.m.} At 5:15, darkness about same as 6 p.m. I drove to 139. Clear, frosty. 5:35, the 3 + 6A not where last seen, nor the 10A. 10A 45 on NW facing slope of N. fork of E. 139

Vicugna

April 8, 1952

Haylarco, 15000', Opto. Areguaya

Draw. 5:35, an ad. up; ^{another} ~~ad.~~ ad. & juv. 5:40. 6 ads. still prone 5:55. Last up 6:05 when seen on ground 50 yds. away. Sunrise on peaks 5:55 a.m. One juv. was prone next to mother. Mother up & grazed, then to feces pile; juv. up 1 min. later. First cotton ads. after trip to feces pile but def. & ur. ^{not} ~~too~~ extra much. First on backs. ^{First nursing 6:10.} 6:20, one ad. prone. 11 ad. present - the ♀ with juv. returned? One ad. & juv. 50 yds. from main gp., & lone prone ad. 50 yds. from there 2. 6:28, prone one up, def. on pile, joined gp. (or prob.). The groups moved toward separate ♀ with juv. so she only 50' from others. 6:30, 6 A at head of W. 139 Draw (+ a juv.?). I drove down road. 6:50, across them from 137. 9, 7 ad.; two prone in seen. ♂ has dried blood seen on lower R. side neck. 5 prone, incl. ♂, 7 a.m. Prone ~~over~~ down cuds. Another prone 7:08. From over 10 to 100' apart. 7:15, 5 on SE ridge of ^{SW} 50+ Branch of E. 138. 2 prone. 8 a.m., drove down road from 137. Road workers at 136. 8:10, at edge of flat N. of 134, 1547J. One juv. appears very young - perhaps born yesterday. This juv. stays by mother, mother 50 yds. from nearest others. None on S. 133 Flat. A lone one 200 yds. N. of 133. 2. // 9:15, the big groups at foot of hills N. of 133. 7, among Festuca clumps, none on flat. // 10:10, ♂ + 3 yrl. 50 yds. N. of km. 138. ♂, ad. ♀; 2 yr. old & 2 yrl. ♀♀ (5 in all) at NW edge of S. 133 Flat. None pregnant. Wet from bathing. One at stream, ~~is~~ standing in water eating stream-side vegetation, at mouth E. 138. 4 Draw, & another 200 yds. up that draw (res. pair?). SLE ♂ atop ridge 100 yds. NW of 138. 14. ♂, ♀, & yrl. on slope across from 138. 8. 7 ad. led by shatter LE ♂ at foot W. 139 Draw. 6 ad. 50 yds. S. of Broken Bridge. 6 juvs. in scattered groups. 4 with the 7. ♂ like at one. Then all 6 with 6A (10:30). The light-colored ♂ alone at stream at 139. 3. 10:35, one juv. lying

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Ucaylarco, 15000; Dpto. Arequipa

among 7 ad., 5 with 6 ad.; the two groups 150 yds. apart & on opposite sides of road. 10:40, 6A to stream, the 5 juv. with. One ad. of 6 may still be pregnant. 10:43, light sided ♂ to 5 yds. W. road at 139.2 & d + m. on pile; 6 ♂ saw & went 50 yds. toward. Other went back across road. 10:48, 6th juv. walked over to others near stream. The 7A within 100' road to W. of 139.05. 2 to 4 of juv. in play-fighting. Then 5 in chase back & forth, finally joined by 6th. They take high leaps up over abutment, ditcher, banks. and fall on side on road & skidded along, throwing up rocks. 11:01, mild play fighting between 2 pairs juv. Rearing & clanking chests & wrists. One prone & another bit at its neck, then lay on its rump & both rose. One, running, trips hind legs one ahead with head. Leaping back with 1 or both feet at pursuer. When I drove up road, 2 juv. to the 7A & 4 to the 6A. 11:45 a.m., on wet grass slopes 1/2 mile NW of 142, saw apparent ♂ chase apparent ♀ for 1/2 hour. At first ♂ seemed to be cutting ♀ out of groups of 4 others, always getting between ♀ & group. ♀ finally ran & ♂ after, tail up, 5 yds. behind. Then they walked, ♂ beside a 5 yds. behind ♀. They went 500 yds. S. of first place. ♂ of a band chased them & over ♂ kept between him & ♀. ♀ tried to join a band but ♂ cut her out & kept between her & band. This was repeated with other groups & other ♂'s of bands. Finally back near starting point. ♀ sometimes held tail slightly arched & again thrashed it rapidly side to side & looked back over shoulder at ♂. The 2 finally to W. for 500 yds. or +, the pursuit continuing at a walk. Perhaps this is preliminary to copulation. About 3:40 I saw band 40 ± ♂ or ♂ near him. 181. Some fighting. a

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Huaylarco, 15000', Depto. Arequipa

juv. got amongst them + was chased a few yards by several. Rock outcrops 1 to 3' high were favorite perches for ♂♂. at km. 139.6, 28 ♂♂, about 6 possibly adult. 3:50, light sides ♂ 50' W. road at 139.4 + a healthy ad. ♀ at foot of E. 139 Draw. 3:55, 6 ad. + 4 juv. 50 yds. E. of Broken Bridge. In upper E. 139 Draw, 10A3J. 7A2J in W. 138.6 Draw. across from 138.8, one ad. + yrling (→ off?). 5 on slope at S. side E. 138 Flat (4:30).

April 9, 1952. Many watched in morning. -6°C. Last night + few clouds. 1:40, I drove up road from 137.5 on slope to SW of ^{E.} 138 Flat. Ad. + yrl. in E. 138.4 Draw. 7 ad. 2J in W. 138.6 Draw. ¹⁰¹¹ 4A4J 100 yds. W. of fork of E. 139 Draw. 7, ♀♀ + ♂, ¹⁰⁰ yds. across stream from 137.55 (♂ no neck seen). 7, ♀♀ + ♂, came down slope, to S., into B.B. Draw. a man walking down road apparently disturbed some. 5A4J at top of B.B. Draw - the 6A4J usually resident? I watched the ¹¹5A4J starting 2:10. 1 ad. + 2J lying down. One juv. wandered to 3 (♂♂?) 50 yds. distant. I then moved it, neck out, + one put neck over juv.

One leaped back at juv. which came close to its rear. Juv. does not assume S. stance - not in any young juvs. yet. ♂ left herd 2:20 + ran down into N. fork of E. 139 Draw + chased 4A3J into lower E. 139 Draw. ♂ stopped on bare hill W. of 139.1. 2:20, ad. up - 2J still down. The 3 separate only 50 yds. from nearest ♀. 2:25, ♂ back to 10 ♀♀. Only 1 ♂ prone. 2:29, last juv. up. so all 11A4J up + grazing. 2:33, juv. moved, L. side ad., 1 1/2 min. 2:45, a juv. moved, L. side. 3 juvs. went 50 yds. from group; The 3 (young ♂♂?) approached them + gingerly moved their heads + shoulders. ♂ of 11A 100' toward + the 3 walked away. Juv. walked

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back to ♀♀. 2:50, ad. lay down. The 4A35 had worked up E. 139 Draw to near territorial boundary. ♂ of 11 ran 100 yds. toward them, + they, ^{when 100-200} 200 yds. distant, ran 100 yds. down draw. 11 ♂ stopped + grazed 200 yds. from them. 2:55, the 7 ad. still gray in B.B. Draw - at least 1 pregnant. Then a ♂ from N. ran at them + herded all to SE up rocky slope; 5 ads. (♀♀ ?) + 1 ♂ at top of B.B. Draw. 2:57, all 11A45 up. 2:58, other 3 juvs. came to top B.B. Draw. 2:59, a juv. of 11A moved, R. side. 3 p.m., the 10♀♀ + 4J's descended to bottom of base N. fork of E. 139 Draw. 6A45 halfway down B.B. Draw. Of 11A45, one J down 3:03, another 3:04; ♂ stays 100 yds. from ♀♀. 3:10, pale hatched ad. (prob. ♂) came E. to stream with yrl. + normal non-pregn. ad. Paler than palest juv. on back; ear tips whitish but upper neck about normal. 6 ♂ ran to them, chased yearling 200 yds. to SE + other ♀ (?) followed, then 6 ♂ ran back toward pale ad. + it ran to other 2, on rocky slope ^{E.} of 139.1. The 4A35 were on S. side ^{E. 139} tributary + 6 ♂ also ran after them a short distance. They continued on, unchanged, to cross from 138.8. 6 ♂ back to its group. The 7 ad. + 3 on the rocky ridge E. of 139.2. Of the 11A, 4J lying down 3:18. One ad. ♀ keeps 100 yds. from others (the same one?). 3:22, the 4A35 chased S. by ♂ of resident 3 opposite 138.8. Pale ♂ + its 2 went to bottom E. 139 Draw + grazed, unmolested, 300 yds. S. of 6 ♂. 6 ♂ d. on pile & saw the 7A at extreme head of B.B. Draw, 150 yds. from him. He walked 100' toward + they went NE over top of ridge. At least 4 of 11A pregnant. 3:40, 4 juvs. of 11A still down, 50 yds. E. of nearest ad. + juvs. of 6A also down + separate from grazing adults. Some looked but none fled from + now walking up road - 200 yds. from nearest. 3:51,

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one, then all, of 4 prone ♂ (off 11A) up + ran N. One ad. followed (so 2 ods. out of sight). One juv. back to ♀♀ + nursed, L. side. One ♂ out of sight & may have nursed ♀ apart (9A 3J in sight). 3:57, ♂ of 6A ran toward pale ♂ + 2, 200 yds. distant, & they ran away at 100 yds. dist., & 6 ♂ crossed tributary 100 yds. chasing the 3 into rocks, then back to main group. The 9 ods., 200 yds. to E. of chase, moved farther up N. fork (prob. all ♀♀). 2:10 to 4:10 contain all lying down + nursings (one?) in 11A + J. 4:10, the pale ♂, alone, going NE parallel & 200 yds. E. of N. fork E. 1398 row. || 4:15, started watching 6A + J. One nursed, L. side. Group 50 yds. across stream from 139.05; all grazing. 4:18, 6 ♂ looked at 7A 2J ^{♂ leading 50 yds.} descended W. 1398 row; several, incl. juvs., called vigorously on dusty area of hillside. 4:20, juv. on pile. Another prone; 2 down: 22. Nose of 6A appears again. 4:27, one juv. up, then other. One nursed, L. 2 juv. prone: 28; 3 at 4:30; 4 at: 33. One up: 35; down: 39. One juv. grazes, prone. Another down, eyes 1/2 closed. ; 45, 3 juv. down. The 7A 2J graze in W. 1398 row, ♂ showing no interest in ♀♀. : 48, 3A of 6 called-copulate in this. 4:53, one juv. up & to pile - no defec.; prob. urin. Then other 3 up & together on pile. 2 lat fall 6 to 20 pellets. One a sure ♂. None known to be ♀. 5:05, some play fights among juvs. & some running & jumping about. 5:13, a juv. nursed, L. 5:15, all 4 juvs. in fast chase. Palest looked ad. ♀ across, jumped suddenly up & to side as if dodging a bee & re-peated this 6 ± X, especially when juvs. ran near. Then it ran with juvs., taking big jumps & quick cuts to side, for 60 ± sec. Then it reared up & clashed with another ♀, latter getting neck over other's & bearing it down to

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ground. ♂ ran up + chased victorious ♀ about 20 yds. By 5:25, more play fights among juvs. Sun low set on lower hills. Full moon coming up. 7A 25 50 yds. W. of 138.9, all grazing. || 5:30, 5 across stream from 138.15. Sun set on clouds 5:35.

April 10, 1952. 7 a.m., clear, frosty, I drove up road from 137.

The 7A 200 yds. NW of 137.9, ♂ + 3 yrl. 200 yds. NW 138.1. 6A 4J on lower ridge 200 yds. E. of 139. 7A 2J at head W. 139 Draw. Switched last. 7:10, juv. moved ^(incl. ♂) 2 ads. prone, then 3. 4 down 7:15, 41 juv. Part of large gp. in N. fork E. 139 Draw visible. 7:18, a juv. prone alongside ad. (the one which moved). 7:22, ♂ up. Grazed on grass or Lycopodium. 7:26, 2 ad. rose - 2 ♂ + 2 A still down. :28, 3A 2J down. One ♀ grazes 50 yds. down slope from others. 7:33, ♂ slowly approached a ♀ + ran after it, 5 yds. behind, chasing it 100 + yds. to S. (over ridge). Fleeting me with ears back horizontally. ^{Prone ones} Only 2 A rose + went 50 yds. down slope to feed. ♂ returned, the ♀ 10 yds. behind, 7:36. ♂ def. a little on a pile. ♂ + ♀ grazed 10 yds. apart. ♀ perhaps a 3 yr. old. ♀ def. + ur. on same pile; squatted now to ur. ♂ toward - ♀ away - ♂ vocal ur. gave wolf howl, defec. briefly, then walked after ♀ which returned to group (7:42). 7:37, a juv. moved. ♂ grazes 50 yds. from group. :43, ♂ to gp. Both juvs. down. :45, ♂ again visits feces pile, lower on slope. :47, juvs. up. To an ad. ♀ near feces pile + assumed defec. stances on pile. A ♀ ad. d. % ur. on pile, + another. An ad. rubbed head on neck juv. juv. reared against side ad. Other ad. ♀ ♀ below at nearby juv., one stopping defec. to do so. :54, ♀ d. + ur. same pile. None late pregnant. ♂ 7:57, ♂ crossed road at 139.05, a ♀ 20 yds. behind. On side mirror, thicker neck + more prone. neck glands

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Huaylarco, 15000', Dpto. Arequipa

only diff. between body of ♂ + non-pregn. ♀. Juvs. craned next to all groups 50' E. road 8:01. Group grazes spread 100', ♂ at edge. ♂ appears entirely not as large or old as some ♀♀ - shorter head, fuzzier. 8:08, juvs. graze 100' from eds. 7:10-8:10 has been intense watching the 7A25. 8:15, SLE ♂ 50 yds. across stream from 138.3. ♂ of 5 in SW Branch ran to 50 yds. S. of the SLE ♂, walked forefoot on side, kicked one hind foot back hard; then to 2 other sides + moved them. The SLE ♂ paid no atten. ♀♀ from SW Branch started walking toward their ♂. One ♀ older than other 3 (yellings?). 8:22, these 4 reached area of ♂ on NE side mouth E. 138.3 Draw. ♂ + 3 yrl. 100 yds. NW of 138. 2 ad. + juv. atop ridge NW of 137.5. Road works at 136. At 135.5, 7A25 across stream. One juv. darker than other. 2 ad. + pregn. ♀♀. 8:45, 15A75 between road + hills to S. at 134.8. 2 juvs. nursed 8:50. A heavily pregn. ♀ + ^(3 or 4) others pregn. 8:58, another nursed. 9:02, an ad. ♀ led across road + several followed, last crossing ahead of car at 9:06. 9:39, a large group on barren hills 1/2 mile S. 133.5. One 200 yds. S. of 133.7; ad. ♂. 5A15 100 yds. S. of him. 133. One ♀ late pregn. At 10:07 the 15A were at base hill N of 134.7. One, on lower slope, had new juv., still with much mucus on it + very unsteady just standing constantly. ♀ had collapsed abd., posterior ribs protruding. New juv. walked, ran, + stumbled thru the herd, mother not following. Other ♀♀ cautiously approached + nuzzled juv. + it telested + hopped away. One older juv. followed + nuzzled it 3rd min. Some blew at or hopped at others which came too close as they nuzzled juv. 10:20, juv. spent 4 min. with head under abd. + between hind

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legs mother (from antenna) but ^{no} apparent nursing. At 10:28, several looked to W. as toward alarm & all walked across & up rocky & bare slope, slowly. Mother with new juv. & another mother with small juv. led. atop ridge, 10:31, new juv. & mother prone, but all on ant of my sight 2 min. later. At 10:07, afterbirth was emerging & it fell out about a min. later - usual blue balloon followed by collapsed raw red bag. Juv. up constantly 10:07-:31. When afterbirth dropped, ad. stopped, looked 2 sec., then walked on.

April 11, 1952. Driving up road from 137 at 7:20 a.m., saw ♂ + 3 yrl. 100 yds. NW of 138, 5 in E. 138.2 Draw, none near 139, but light sided ♂ with ad. ♀ across stream from 139.4. // 5:50 p.m., 20 min. after summit on highest peak, 5 A 15 on slope across stream from 140½, one ad. prone & rest grazing.

April 12, 1952. 7:40 a.m., along road from 137 to 133 & saw only one, alone, 100 yds. N. of 133.2. An alpaca on S. 133 Flat & a large gp. vicuñas ¼ mile SW of flat on bare hills. // Majoritario of road crew says he saw vicuñas copulating near summit at about 6 a.m. one morning. He says that every day young are caught by dogs of Indians passing thru & that the hides are sold in Bolivia, Huancané being a center of this trade. // 9:55 a.m., ↑ up W. 138.1 Draw, apparently ♂ + 3 yrl. 2 in E. 138.4 Draw, one a yrlq. 138.7, 7 A 25 50 yds. W. of road, grazing. 10 a.m., ♂, ♀, yr l. at stream at 138.8. 6 A 45 at stream at 139.1. ♂ headed 4 ♂♂ (1 ad. + 1 yrl.) back W. from 50 yds. E. of 139. At foot N. fork of E. 139 Draw, 11 ad. (or +) + 4 J., one ad. 100' from others. 10:15, one of 6 A 45 nursed. An ad.

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bothered, slowly lying prone in 6" water & staying down 5 sec.; up & repeated. Out for 3 min., then in & prone again, then ran out of stream. Juvs. near but not seen to drink or bother (do they drink?)
 Clear clouds, fair wind; sunny & dry. 10:20, ♀ which bothered is prone; no others in gp. The light riled ♂ with ad. non-pregn. ♀ 100 yds. W. of 139.3. 10:30, two dogs, one black & other black & brown, came from W. toward the 6A4J. I ran to scene & found dogs returning but the 6A4J and 11A4J gone & from top of ridge E. of 139.2 I could find none. 11:30, one chased another down W. 139 Draw (I believe ♂ there chasing ♀) with many throaty cries, & on up stream for 1/4 mile +, apparent ♂ 5 yds. behind other. 11:45, apparent [♀] non-pregn, followed at 5 yds. by ad. ♂ (neck glands prominent) walked NW across SW branch of E. 136.2 Draw & to mouth tributary Cat stream). Leading one occasionally shield. The two walked (1 sec. later. steps same foot) NE across foot of E. 136.4 Draw, ♂ leading. 11:2:40, started watching 7A2J at mouth 135.5 Draw. ^{1 bull, maybe other probably 2 pregn. ♀♀.} One juv. smaller & darker (D♂) than other (L♂). Several nuzzled on grass. 3 p.m., all looked to W. - where I could see no cause for alarm - & all but ♂ ran several yards up slope. 3:05, all walked slowly to below mouth E. 135.6 Draw, ♂ trailing & looking back to W. 3:20, a pregn. ♀ used pile; then 2 other ♀♀, same pile. :29, D♂ prone - up. :26. :32, D♂ prone. :34 L♂ prone, the 2-6' apart. They nuzzled at grass. 3:48, all started up E. 135.5 Draw, pregn. ♀ leading & ♂ in rear, ♂ after stopping & looking back, as Indian woman walked toward group from 300 yds. to W. Standing atop a 2' high

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Huaylaray 15000', Dpto. Arica

hunted on slope, or allowed woman to pass at 100 yds., group 50 yds. beyond or. or turned & faced woman after she passed. Group grazed.

~~grazed~~ D. prone 3:55. Fair W. wind. When woman 300+ yds. away, or (D. prone) grazed a bit then walked toward group. 4 p.m., or ran past its group to 100 yds. S. of them, an ad. (prob. or) ran from S. to 100 yds. from or. They stood, or with tail up; distant one lay down & or grazed (4:04). Some ♀♀ & juv. rolled on loose bare ground. 4:07, the lone or walked to NE & 100 yds. behind him 15 ♀♀ with 9 juv. (S. 133 juv.?). or stood 50 yds. N. of them & watched. 4:10, group ⁶⁴²⁵ walked slowly to or. ||

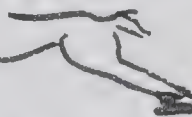
4:39, on S. 133 Flat, 16 A 9 J at SE edge, 54 J at SW end. I watched in a group & larger group. 6 juv. lying down 4:30, then all separate from adults. 4:34, all juv. up; one ad. prone. 3 juv. used one pile ^{at least} ~~separate~~ ^{separate} from adults. ♀, hind legs bent as ♀ ad. in urinating. One juv. nursed 4:35, another 4:36. One ^{two} ^{very} ⁴ ad. heavily pregn. :37, 3 juv. prone & 1 ad. still. :41, only 38 prone. 2 ♂ in play fight. :42, juv. nursed. :43, 5 ♂ prone. :46, 4. a juv. blown at when approaches to 5' behind defec. ♀. :48, 38 prone. :50, 2 ♂ prone. Some in play fights. :52, last juv. up when pestered by 2 others, but another down. All juv. up :54. Play fights. :57, ad. up, so all up. 5:02, one nursed. One ad. (or?) walked & ran 100 yds. SW of group & defec. on pile, then grazed near it. 5:04, 38 prone & feeding. All up 5:07. :08, 38 down & feeding. Group spread 200 yds. but working toward or. :12, 4 ♂ prone; 2 fighting. 5:15, only 2 ♂ down. 5:20, sunset. :23, 4 ♂ prone in 2 pairs. A juv. chased a grass rabbit ran, flapping wings; repeated 3x, juv. not closer than 10 yds. :25, only 2 juv. down. Another nursing. :29, 20 up; another down; one nursed. :31, another juv. nursed. Some juv. in play fights. 5:37, group spread 300 yds. 2 ♂

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Haylaog 15000; Dpts. Arquis

prone. : 38, one J prone. : 41, ad. prone on flat - no juvs. 1st
to see details at distance. Only 1 ad. up of 5 A1J at SW end
of green flat. 4 juvs. in front race 100 yds. from ode.
& back; then 5, going around & thru group ads. : 48,
grp. more concentrated - spread about 100 yds. 5:55, some
barely make out but nearly all still up.

April 13, 1952. At 5:30 a.m. of frosty morn arrived near S.133
Flat. 2 ads. of 16 were up, & the 5 A1J prone, about where last seen
last evening, on flat grassy area. All juvs. by adult, usually
parallel & against facing same way; 1 reversed. 5:32, a juv. of big gp.
up, nursed. Frost on back. juv. prone after nursing. : 37, 1 ad. of
5 up. 1 ad. of 16, prob. ♂, prone 100 yds. S. of others & slightly
higher. 3 ads. graze. A juv. & an ad. have chin on ground. : 39,
& juv. up, then adj. ad. A to pile; juv. nurses while ad. on pile. One
A down again; 3 A1J grazing : 42. Sunrise; diffused by cirro-
stratus clouds. All 5 A1J up save 1 A. : 45, of 16 A gp., 5 A2J up.
: 46, 4 J. : 47, 7 A 4 J. An ad. up & to pile, then 4 J's on pile. : 49, 10 A 4 J
up. : 50 11 A, 4 J. One ad. stretches when rises by leaning
forward with hind legs extended back . : 52, a mild
play fight betw. juvs. 11 A 6 J up. : 55, 13 A 7 J up. An ad. up &
defec. - often but not always first act - prob. do at night.
: 56, only 3 A of big gp. still down, including separate ♂. An A & juv.
of 5 A prone. Only 2 A of 16 prone. ^{little or} No play among juvs. Not all juvs.
nurse first thing, & nursing about 1 1/2 min. as usual, so
probably nurse at night. 6:01, only ♂ down. A juv. has prone
: 02, 2 A of 5 prone : 03, ♂ of 16 up; grazes & approaches ♀.
Often a juv. prone 1 or 2 min. & grazes - 3 so at 6:07. all

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April 13, 1952 Huaylarca, 15000', Dpto. Arequipa
 5A1J up + grazing. :13, 5 of big gp. nurses. A brown & white lame
alpaca appears on barren hills $\frac{1}{4}$ mile S. of 5A1J. They look, then
 walk away as alpaca toward to 200 yds. alp. stops on pile-
 moses & squats in manner vicuña. Then runs toward 5A which
 flee at 100 yds., or staying 50 yds. in rear gp. alp. uses 2 more
 piles. 5 or stays 100 yds. from it, then walks to its gp. 6:19,
 a juv. of big gp. nurse. :20, alp. runs 50 yds. toward 16 & stops
 & uses pile. alarm cry from vicuña. The 16 walk away, then
 run 100 yds. SE as alp. ran to 300 yds. from them. :23, 16 run,
 the 7 in rear not juv. alp. uses pile last used by vicuña.
 The 16 4 300 yds. SE of early grazing spot on bare low hills.
 :27, alpaca walks, then runs toward nearest vicuña, & the
 16A1J, but across slope spread 100 yds. up & downhill. Do not
 flee uphill from dog or man! 6:32, the 16 arrive at a feces
 pile & several ad. & juv. use it. 6:35, alpaca does not come
 closer to 16, which now are among Festuca on slope, 600 yds.
 from starting point. Alpaca slowly returns to 5.133 Flat where
 5A1J are at SW end. Gradually alpaca to SW, oft stopping
 on feces piles & squatting - is this more than vicuña; prob. a
 hot or. 7 a.m., alp. 100 yds. from the 5A1J & they run 100
 yds. away on flat, to W. // Reminds me I saw about 5 feeding 100
 yds. from sheep flock a few days ago. // alp. to another feces pile
 & does not pursue the gp. which walks away on bare ground. //
 7:20, 4, at least 1 ad., at foot 5.135. 5D ran. // 8:30, 2A1J move
 from 138.8; 7A 50 yds. W. of 139.05, then 2 juv. with 6A1J
 at stream at 139.1. 6A ran at 4 at road at 139.3 which
 had been chased E. by another ad. The 3 run NE across &

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Huaylarco, 15000', Opto. Arequipa

up rocky hill. 8:36, ♂7 (shorter LE) of 7 crossed road & grazed
50 yds. from an ad. of the 6. 4 across by 8:41. Two ad. just w.
Stream at 139.4. :45, all 7 across road - one within 50' of 6 or 7.
8:50, 1 ad. of 6 + 7 and all 6 juvs. lying down. :56, juv. of 6A
nursed. All 7 A up & grazing 50 yds. E. of 139.05. 9:01, another juv. of
6A nursed. 9:05, youngest ♀ of 7A back across road, drank in
roadside ditch, 3 dips of 5 sec. with look about between. . 9:10,
some ad. up. I moved car to near Broken Bridge. All up & moved a few
yds. 2 juvs. back to the 7A. One nursed. Nursing usually broken off
by mother moving away & no strong attempt made to resume. An ad. off
within 100' of the 7 (9:20). 9:24, other juv. of 7A nursed. 9:26, light
sided ♂7 & ad. ♀ grazed 50 yds. NW of 139.2. 9:30, all but 1 of 6A had
crossed to E. side stream, 5 juvs. with them; 2 or 3 juvs. ~~down~~ def. 9/4 cur. in
stream. ~~suck.~~ The 7A, 50 yds. E. of 139 post. 9:43, the 6A & 7A 150 yds.
apart, 6A on E. side stream with all 6 juvs. 9:55, the 7 to
stream near mouth E. 139 tributary & 6 or came to near them, tail
up. At stream at 138.85, the 2 ^{ads.} ~~ads.~~ prone & spl. grazing. 10:05, the
6 juv. together near 6A at mouth E. 139 tributary. Two in play fight.
They reared, then down, one with neck over others just behind
head, the under one being thrown in a backward [?] somersault.
10:10, an ad. (♂?) to W. side road at 139.1; 6 or to stream opposite.
The other ♂7 retired 100 yds. W. up slope to 2425 elev. 7 or came
from group near stream to 100 yds. E. of 138.95 & stered. It
grazed & 6 or back near group by 10:17. 7 or to 100' S. of mouth E.
139 tributary; 7 or to side of stream across from it, both with
tails a little arched. 6 juvs. stay with 5♀♀ of 6A (10:20). A juv. of
6A nursed. Juvs. ran about & had play fights. :27, 3 of 4J lay

Vicugna

April 13, 1952.

Huaylarco, 15000; Dpto. Arequipa

down & 25 lead to 7A. One ad. ♀ of 6A seen. ^{6 just} 707 across stream from some of the 7A; occasionally it ran a few steps toward them & drove them a bit back. Testes protrude like but do not hang ^{down}.
 10:35, 7 started upstream, ~~or~~ seeming to herd them on stream side. One gave a warning warble - the 7 ran across to W. side road with 1 juv. 6A with 55 ran to base hill E. of 139.1. Workmen walking up road. Within 5 min. one juv. went from 6A to 7A. The 2A18 had moved 200 yds. up & across slope to opposite 138.9 (10:45). ||
 3:30, two adults across stream from 138.3. Suddenly a short hard fight & 100 yd. chase, then the 2 stood quietly 10 yds. apart & soon resumed grazing. Several groups of vicuñas up E. 138.2 Draw which, about 1/2 mile from road, became wide & flat bottomed & very green ^{& wet} on bottom. Much green Distichia there. Found but 1 carcass which appeared to be of this year; no carrion. || Many saw & chasing ♀ of upper E. 139.8 ran gp. in evening.

April 14, 1952 7:15 to 7:30, up road 137-139 & return. 2 in

E. 137.5 Draw. 7 ad. 200 yds. NW of 137.9. 5 on E. 138 Flat. 7A25
 7A25 at head W. 139 Draw. Light ridged on E. side creek & ♀ on opposite side, prone, at 139.3. Workmen walk down road at about 7 a.m. || Sps. away from road seen yesterday had not over 2 juv. - heavier dog mortality? 8:30 a.m., drove down road from 137. 5A18 at SW end of S. 133 Flat, same place at other end. 14A85 at edge slope N. of 135.2. Two juv. stick together & have back height of chest mottled (possibly another now ^{one of} since ^{one of} a few days ago). Returning at 1 p.m., this group N. of 134.8. At 3:25 p.m., on both sides

Vicugna

April 14, 1952

Huaylarca 15000', Dpto. Arequipa

road at 134.4. Several small rocks & spouts up slope S. of road, but then crossed to N. side road where my car stopped 200 yds. distant. Light wet snow falling. 3:30, the 2 smallest & juvs. lie by mother; all rest of group up. 3:40, ⁴older juvs. prone in snowstorm; ads. stay up & graze. 3:45, only 1 juv. up; light hail & rain. 3:53, youngest juv. nurses, L. side, tail up at first, for about 2 1/4 min. with several pauses of a few sec. Pardon & thinner than other juvs. Rain ceases. Youngest unsettled in scratching ear with hind toe. Light snow (3:58). Youngest (YT) by mother. 4:01, another juv. nurses, R. YT prone 4:01, 5 yds. from mother. Only 2 juvs. up. One & juv. av. on pile; urine in 3/sec. spurts. 4:12, 3 juvs. up. 4:17, 6 juvs. up. one wags ears of prone YT & it shakes its head. YT up - tail up when older juv. approached from rear. YT & mother walked a few yds. away. YT nursed again, R. side, tail up. 2 1/4 min. Slightly older juv. nuzzled YT; mother blew at it. Mother & YT went 50 yds. across slope toward main gp., then up Festuca slope 100'. It blew at 2 closely following juvs. Another juv. chased YT 100'; mother watched first to it. 4:25, YT ran 50 yds. to another juv. - mother ran to it. Lightly snowing. Group at & on bare hills N. of 134.2. 4:30, YT nursed about 1/2 min. Mother watched away. YT made other attempts to nurse. Once 20+ sec. Mother grazes & pays no atten. 4:35, YT nurses 15+ sec., L. By 4:43, the gp. at foot of hills N. of 134, YT & mother 100 yds. across & up slope behind others. YT nursed 10 sec., then prone (:44) beside grazing mother. All others up & grazing on flat at foot of slope. :48, a second juv. prone; up :50. 4:58, YT up, nursed 2 min. & mother stood quietly. There 2 150 yds. behind group & 50 yds. up slope from their level. 5:10, group at marsh drain N. of 133.7, the YT & mother 300 yds. NE of them on slope. YT

Vicuñas

April 14, 1952.

Haylarca, 15000; Dpto. Arequipa

nursed & lay prone. Calm, $\frac{1}{10}$ overcast. 5:28, an ad. of group ran 100 yds. across & up slope toward separate mother & juv., to higher level on slope, & looked toward them. Another joined it. 5:32, YJ rose, nursed. The 2 ads. to top barren ridge & toward ad. with juv. walking atop ridge above nursing one. Group began to walk up slope. YJ & mother walked across & up slope - rocky & bare ground above grass line. 5:35, the other ad. & juv. walked out of sight to N. on ridge top - there apparently 10 yds. & leading trail to night spot. 5:40, main group halfway up 200 yd. slope. YJ nursing again, mother standing quietly. 5:43, all atop ridge moving eastward, strung out. 5:45, ³ juvs. nurse & are thus left in rear of group. Thus, ♀♀ brought up rear, unhurriedly. 5:50, about half out of sight atop ridge N. of km. 134.

April 15, 1952. Drove up road from 137 at 8 a.m. Road men had walked down to 137.6. Ten floor E. 138.2 Draw. 6A45 across stream from 139, 7A25 on road side of stream there, 11A55 at foot N. fork E. 139 Draw, 2A15 across stream from 138.9. I ascended a hill W. of 138.8 to watch. The 7A25 ran across road to 100 yds. W. of 139 & the 6A45 went 100 yds. up E. 139 Draw. 8:30, returned to car on road. Cirrus clouds, cold wind; light, icy snow last night. At least 2 ad. of 11 pregnant. 9 a.m., 25 of 7A were prone together, one having fed 8:50. The 3 all prone on slope opposite 139. The 11A at top S. fork E. 139 Draw. 6A45 200 yds. from stream in E. 139 Draw bottom. 9:15, a juv. of 7A nursed, then prone, feeding. Yelling of the 3 to side near north E. 139 tributary - 607 walked 100 yds. toward it; yel. walked away when there.

few. & ♀ more or, &
few. on ♀ neck
ocean pier.
more easy
back hd.

150, chase. hd up. Freely on.

53 - Dawn. rostrals. or, younger.

Pelvic. 3/4 sec, irreg. Shift legs much.

By 12 - no actn by actn.

At sand

06 - ♀ up - 20 yrs, or, for on.

Pen , 6".

Canary. ♀ calm - mouth. dit. always

or, under myrtle on ear - back hd. & lateral ear.

113 - 3/4 sec. short.

Pelvic. settled - quiet. - 5" above ground.

115, or, up. ♀ then. - hummed. noise.

No alarm. or, grazes 10' away.

♀ tail flat. few. older one.

Vicugna

April 15, 1952

Huaylarco 5000' Depto. Arequipa

5 min. later, 6 ♂ at slow run to spot, the 3 retreating 100' to S. or in rear, tail up, + ran to boulder + put forefoot on, ran to 6 ♂, then joined its ♀♀. 9:30, at same alarm to S. the 11A5J to N., + 6A4J up on rocky ridge to N. The 7A2J moved at fast walk 100 yds. across + up slope. Juvs. + some ♀♀ d + u. on pile; ♂ from 50 yds. from them (9:35). The 3 had left first, to ^{E.} along sidehill up E. 139 Draw.



9:42, 2 women, dog, sheep, at head W. 138.6 Draw - prob. same alarm.

Sheep in W. 138.1 Draw. 11:45, km. 139.7, the big group ^{15A8J 14A7J} 13A6J, at edge hills to N. One chewed + dropped long stalk which must have been Festuca (acrophylla?). Another took some ^{small} pruning stalks of this grass. One A + J 50 yds up slope from others. VT? This juv. nursed 10:08 for about 2 min.; tried to resume + head knuckled out of way. Another ad. + juv. 50 yds. across slope from this one; this last apparently VT, prone by mother 11:20. These 2 appear to be youngest juvs. They lie among Festuca clumps on sandy slope. 11:30, VT up + 50' to mother's side, then both went 50' down slope + juv. prone as mother grazed, now only ones up on the sidehill. 11:36, VT nursed 2+ min. Mother then prone on slope. Juv. down + up. :42, both up + moving along sidehill. VT prone :43. :48, VT up, following mother toward group. One juv. has tip L. ear curved back + division line on side between paler + darker color. 11:50, VT. nursed, + again 12:22 (perhaps between too). 11:50, ♂, 100' from group, suddenly ran into group with head + especially muzzle high as if spitting, + began to chase a ♀. They ran back + forth 3 times about 100'; then ♂ put face over side of rump of ♀ + both stood. In about 1 min. ♀ lay prone (11:53). ♂ worked forward into copulating position, always on side of rump of ♀.

Vicugna

April 15, 1952

Huaylaro, 15000', Depto. Arequipa


On juv. raised & much & lay steps its neck for several seconds; & neck borne to ground. Juv. also moved foreleg & side abd. ♂ & was at most given a warning throw of the head. An ad. ♀ also raised side of ♂ without retaliation. A second juv. briefly raised ♂. ♂ constantly made slight shifts of position, both forelegs (as if trying to get far forward) & hind. Anus ♂ about 4" above ground, tail straight down against ground, heels & toes on ground at outside of ♀'s. In final position ♂ rests just behind ♀ shoulders, resting on her. Pelvis moves forward more than other parts; movements irregular but fastest 3/sec. ♂ nostrils flattened , dilating irregularly. ♀ nostrils constantly dilated. ♀ has less inflated top head, whiter face, shorter ^{long} hair on crown, than ♂ - probably older - & about = neck glands & neck thickness (age?). ♂ often pushed its muzzle, mouth closed, against back head & base ear of ♀ - rarely she pulled head away. At start ♀ turned & moved chest ♂. ♀ gently quiet. Ears both open, ears back horizontally to as in rest. ♀ seems most alert & stares at my car, 100 yds. away on open flat. Others of group pay no attn. after first 5 min. 12:06, ♀ rose, ♂ retaining forelegs outside her hind quarters. ♂ penis dark grey, 5±" long, slim & pointed & flexible . ♀ went 20 yds, ♂ outside, then prone again & ♂ continued pelvic movements. Rump (back ^{lower} pelvic) ♂ vertical behind rear of ♀. More muzzling of ♀ back head & ears, one ear held down by this pressure for several seconds. 12:13, several strong pelvic thrusts at about 3/4 sec. intervals, then pelvic quiet. A few

$$\begin{array}{r} 9 \\ 14 \\ \hline 31 \\ 54 \end{array}$$

Vicugna

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Huaylarco, 15000', Depto. Arequipa

now squirming then ~~or up~~ + off of own accord, no alarm, + grazed, not giving ~~q~~ another look. ~~q~~ rose + immediately its juv. nursed. This is one of larger juvs. - pale, straight backed, well filled out - perhaps a month old (max. possible, Feb. 20 to Apr. 14 ~ 54 days). ~~q~~'s tail flattened by ~~or~~ act. The ~~or~~ + ~~q~~ graze 10' apart with no notice between them next 10 minutes. By 12:45, group on flat between Inm. 135 post + hills 100 yds. to N. // I saw pregn. ~~q~~ scratched with one forefoot, then other, 3⁺ strokes, then feed at spot, among Festuca clumps on flat. Closest to foot hills is Y~~5~~, prone, lying, its head gradually falling back until muzzle vertical before recovering, rather a few ft. away. 12:50, Y~~5~~ up, nursed 2 min. + two sucks of several seconds. Apparently on 1/2 hr. schedule. :53, Y~~5~~ prone 10' from mother, 6' from another small juv., among Festuca clumps. All 8 juvs. but none prone. 1 p.m., Y~~5~~ up. To rear an ad. ~~q~~ which turned head + blew at it; then stuck head under belly another for several seconds. 1:35, group gradually to SE across road at 135. 1 - no more sexual action by then. I went to spot where scratching seen + collected remnants of scrubby stemmed ~~or~~ plant with large roots. Digging about 4" deep. One root 1/2" diam. broken or eaten off. Simple leaf  with warty surface. Other scratching left only roots of a compound-leaved plant. Roots much branched, spined, + cut off at 3/16" diameter. Saved parts both plants. // 4:45, drove 137 to 139 & return. 5 ad., incl. ~~q~~ ^{E. 138-4}, in ~~road~~ Draw. 7425 100 yds. E. of 139.1. Large gp. in N. fork E. 139 Draw. 5 (who?) ad. at head W. 137.5 Draw. a little hail in evening.

Vicugna

April 16, 1952

Huaylarco, 15000', Depto. Arequipa

7:50 a.m., now on S.133 Flat but usual alpacas there, a ^{about} group, 15A85, on near vegetated hills $\frac{3}{8}$ mile S. of flat on barren hills, & another large group with juven. $\frac{1}{4}$ mile S. of flat among Festuca clumps. On S.133 Flat, fresh piles now greener than intervening vegetation. Mounds about 15' diam, about 1 ft. high at center, center $\frac{1}{3}$ solid feces, dense thick greenery about 1" deep (nettles & a thick Oleander plant mainly) to edges. Pellets 11 to 15 mm. long, 6-10 wide, dry over firm but can be squashed with hard pressure betw. thumb & forefinger. Feces piles 50-100 yds. apart & ^{sometimes so} rather regularly spaced. Provincial plant 1" tall grass with fruiting stalks to 2 or 3" high. Between is fairly solid growth of perhaps 10 species rarely over 10 mm. high. An old carcass, hind foot 345 mm., had "fighting teeth (all 3) emerged 3 mm. from bone of skull. I went up onto rolling hills S. of S.133 Flat. One ^{suberulent} foggy-leaved plant main one but no evidence eating, & there not easy to find. Dusty ground with much pea-sized gravel & lots of walnut & larger size. Trails conspicuous at distance with cross lighting, but tracks every-which-way. Trails have occasional branches at about ^{74-75°} 30° angle. 6-8" wide & about 1" deep, ground not packed hard in trail & inconspicuous at close range. Llawa trails hard packed & run 3-4" into ground in parallel lines, perhaps 10-15, with vegetation between. Vicuñas do not have close ~~run down to~~ ^{run down to} parallel trails. These trails seem to lead from grazing areas back to higher hills as for retreat & reentry to grazing area. Occasional feces pile in center of vicuña trail, & there are only green

Vicugna

April 17, 1952

Huaylarco, 15000', Dpto. Arequipa

but grazing. This morning noted that dog barks at him. 136 did not disturb vicuña in E. 137 Draw. On a prev. occasion noted this with ^{or 2} ~~6~~ ^{groups} at him. 139 - barks alone, dog out of sight, do not cause great alarm as sight of dog does. 1:45, YJ 6' from mother; other 2 20' distant & not close to adults. 1:48, YJ 10 yds. from mother, chin on ground. 1:50, YJ up & nuzzled, L, 1 1/2 min. mother grazed after 1 min. & moving forward detached juv., & it did not try to resume (may be a week old). Juv. prone 1 min. later - bent back forelegs together going down & did not show them ahead as at a time in final movements. Or 50 yds. from nearest ♀. 1:57, OJ up & grazed. 2:01, LJ up, then prone again (larger than OJ - first juv. of ysp.) 2:02, YJ up & to mother, 10 yds. away. Or briefly used pole. 2:05, YJ prone 10' from mother; this juv. darker than OJ (with chocolate color). 2:07, Or to ^{them} small it shied away from bird flying by - or its shadow. 2:08, LJ up & walks toward YJ. YJ up, stretches hind legs (front normally retracted), & walks to mother (all juvs. up). 2:12, YJ prone 10' from mother. OJ prone & grazing (ads. seldom do this). Or back from stream (drank?). Sp. now below foot of E. 135.6 Draw. 2:13, both elder juvs. ^{up &} grazing. A ♀ rolled, rose, shook hd. YJ on side, neck up; legs half closed; legs & head & neck bend back slowly, then resumes. 2:17, LJ rolled. YJ 100' from mother. 2:22, YJ up & to mother, tail up mother nuzzles anal region while juv. feeds nipple. OJ rolls. YJ nuzzles 1 1/2 min., R.-side (same juv. sister side), then mother walks away a few yds. & grazes. Possibly a pregn. ads.; a note as she does pregnant, occas. with tail a little out. Juvs. YJ 20 yds. from mother to other th juvs. I have seen a little afraid of YJ & run a few steps, sometimes with head drawn back so much



Vicugna

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in an S. or to pile, d. + w.; grazes 100' from nearest ♀ (2:33).
 all juvs. up still. :34, YJ rolls, then prone 10 yds. from mother;
 then on side, head up. :37, L♂ prone + grazing. :38, YJ to mother; puts
 mouth up to mother's. Lies prone 10' from mother. :39, or used an-
 other pile briefly, then up slope to 100 yds. S. of others, then to near
 crest hill - 200 yds. from grp. 2:42, L♂ nursed. :43, D♂ nursed also.
 Copycats? ♂ starts down road from above rocky slope. :47, or
 starts - D♂ prone + grazes. ♀ rolls + up. :50, YJ + D♂ still down. :52,
 L♂ prone 10' from D♂; + grazes. :57, or comes down rocky slope, uses
 pile 10 sec.; grazes 150 yds. SW of ♀♀. YJ up + nurses, L. side. Mother
 grazes + breaks off feeding. 3 p.m., YJ prone 10' from mother (3 juvs.
 down). 2/10 cumulus + fair breeze. 3:05, one ad. to stream. 3:07,
 YJ mother ran to 20 yds. from or + grazed; juv. to her within 1
 min. 3:08, pregn. ♀ to stream, then as mother + a juv. Light
 pregn. ♀ uses pile, then grazes 150 yds. from others (didn't mean
 to near or). YJ runs slow back to her, then back to others.
 3:11, YJ tried to nurse - not seen. at last. Pale pregn. ♀ looked
 up at sound car starting 250 yds. away. One ad. feeds on side
 of bunch grass + mat island clumps in near-dry stream bed.
 Elder juvs. bite at Pycnophyllum + other clumps + walk mouth as
 if feeding. YJ prone by mother but up when other juvs. walk 10'
 away (3:17). 3:20, 2 ♀♀ d. + w. on pile. Pregn. ♀ (dark) leans
 at D♂, 6' away. 3:21, D♂ uses pile. YJ prone by mother but up
 when D♂ to 3' away. :24, YJ prone - D♂ waves its face + head
 until it rises. Elder juvs. have longer hair than YJ. :25, YJ
 prone by mother. Pale pregn. ♀ walks to 50 yds. from group. Dk.
 pregn. ♀ also occas. wags tail a little at for a few minutes.

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3:28, DT prone + grazing (only LT up). Ad. ♀ α + m. on pile. 3:35, mother 100' from VT. Dh. pregn. ♀ grazes huts. 2 prone juvs., 5 yds. apart - no reactions. 4:2, dh. pregn. ♀ had tail arched 7 min., then not. VT up + to dh. pregn. ♀ - blown at + then driven back several yds. 4x in succession, once shared several steps too - 3x VT walked back to this ad. Then VT ran to mother, 50 yds. away, + nursed 1+ min. Mistake any ♀ for mother when young? 40 min. schedule for VT. Prone 6' from mother after nursing. DT still prone 3:45. Pale pregn. ♀ 50' from nearest at one end gp., or at other end. 3:59, VT up, nose rocks - apparently eats little or no paste yet. 4:55, VT 20 yds. to fence pile, noses it, maintains def. stance about 1 min., noses pile, turns about, in stance 15 ± sec. + at least one black pellet fall, then walks off + lies prone by mother. Up 4:57, with mother. Pale preg. ♀ has slowly joined edge of gp. VT approaches LT, then quickly a few steps away as LT pulls neck into s. VT puts head huts. hind legs mother from rear - mother lifts knee; same response to attempt to put head under belly. 4:03, DT up. 4:12, LT used pile. 4:14, or going up E. 135. 5 Draw. Mother of VT blew at LT + DT or walked past them, joined by VT, + followed or. Elder juvs. behind her - in brief play fight. 4:17, or up on barren hill among boulders - others ran back down to grass - so or 200 yds. from + 30' higher level. On schedule, 4:19, VT starts to nurse. Mother grazes + walks + does not cooperate - but juv. nurses about 1 min., then tries between hind legs from rear + at side nursing mother. 4:23, mother + VT run to stream + across, then to road at 135. ♀. No other follow. ^{or - ♀ - juv.} Large groups near km. 135. or of 6 A steep ridge,

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300 yds. SW nearest of gp. 4:26, mother & juv. run back to stream near their group. mother grazes 60 yds. from others. LT prone & feeding 4:28. YJ nurses about 1 min., mother standing still. 4:32, sides, juv. up & grazing 6' apart. :34, YJ prone 10' from grazing mother. Juv. could be aged by time between feeding, & less accurately, by color. :38, YJ up & walks to mother 100' away, & the two go up E. 135.5 Draw, then up slope (to rd) toward rd. 4:39, DT nurses 1 min. +. The group 100 yds. S. of km. 135 has at least ^{11A50} ~~10A05~~ ^{NO. K. 500.} (or saw 10A75 earlier today in vicinity ^{O.K. 2} last seen was mother?). 4:45, two mothers with LT & DT go up E. 135.5 Draw. YJ & mother stopped 50 yds. from rd at top ridge. As in most movements, 2 pregn. Pale preg. ♀ lost; rolled on dusty slope before starting up. ♀♀ in rear. :48, YJ prone among Feather clumps but up: 50 when others 100' away. Pregn. ♀♀ trail 100 yds. & ascend over road shortcut - not same route taken by juv. & mothers. Pregn. ♀♀ climb laboriously & both have slight depressed hind over rump from ^{propped} anterior one thigh to other - stretched skin? :53, rd out of sight, mother & juv. stop ridge, pregn. ♀♀ 50 yds. down slope from them. Then all 200 yds. W. of S. ¹³⁵ ~~133~~ 5 Draw, heading SW. 4:55, all ♀♀ out of sight at top ridge. This account from 1:30 is intensive watching - possibly missed feeding of LT as a hill obscured some action 4:05-4:15. This includes nursing, lying down, rise pile, rolling. ^{11A50} ~~14A05~~ (I lost 14A05 - last later 140) ~~14A05~~ at S. side road at 135.2. 5:03, a truck down road - group ran 100 yds. to S. 5:10, ^{from near} ^(or of the 6A35) rd of their group slowly angled up E. side of small draw opposite 135.1 to top where the 6A35 were visible, ~~then~~ out of sight behind rocks (for?). The top group moved

3 juv. 3 hrs

$$\begin{array}{r}
 1.5 \\
 \hline
 6.66 \overline{) 10.000} \\
 \underline{666} \\
 3340 \\
 \underline{3330} \\
 10
 \end{array}$$

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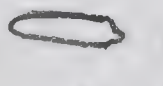
little or none, (~~perhaps not about~~). 5:15, ♂ to lower hill & looked down on 11A 55, then back toward top group. 5:20, the group (11A 55, none very young) ascended to N. side road at 135.2. One ran 10 yds. after another. One blew fog at another. One, tail out, chased another adult across + to top slope (♂ after ♀?). Two ad. ♀'s in brief fight - heads & closed forelegs; one forced other's neck down with its own. 5:25, remainder of group went up rocky barren slope to N.

April 18, 1952. 8 a.m., clear, 7 ad. (no yrl.) crossed to SE side road at 137.9, grazed by stream, then up SE bank. 3 yrl., ♀, & ♂ (the E. 138.2 gp. of 5) were 100 yds. away at edge E. 138 Flat, ♂ prone & chewing cud. 8:08, 7 ascended bank - 5 ♂ up & chased to SW end of E. 138 Flat & stood at edge flat while the 2 ascended hill. ♂ at W. 138.1 Draw, ♂ + 3 yrl., ♂ prone. 8:29, BB Draw, 6 A 45, the 40 prone. a man with small dog walked up road about 7:30. Drove to 133. Lone ad. 200 yds. N. of 133. 3. The alpaca but no vis. on S. 133 Flat. Km. 131.6, 6 A 15 on gravel pampa 200 yds. N. road, + 1/2 mile N. road 7 A 15. 9:30, 7 A 35 1/4 mile S. of km. 129. 3 A 15 a km. N. of 128 1/2. Men working on road at km. 127. Scattered square miles visible of gravelly barren area. 10:05, 20 ♂♂ going N. at W. end of S. 133 Flat. // At about 9 a.m. had noted none near 135 in passing but at 10:30, group of 5 A 85 was on gentle & boulder slope 200 yds. S. of 133.1, only one at stream at foot slope. Most adults out, one pair. went to top edge & on sheet - bathed, prob., as no deep water here - no necessary wading in fact. 10:30, all at top slope or near it. Some prone a few min. upon

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Huaylarco, 15000', Depto. Arequipa

reaching top 10:42, one stands at brow hill + looks down near road at 135.1 where ⁵6 ad. (or it appears) - 4 of 5 perhaps 2 yrs. old; full adult darker & more reddish. There ⁵at foot S. 135.6 Draw at 11:20. The 15A8J moved W. along ridge (spring Festuca & loose soil) toward S. 134.7 Draw. S. of head of S. 135.5 Draw, about 600 yds. from stream, a group which may be 643J of yesterday. Pellets on fence pile measured - few days ago dry; new ones, 13x9x9; 15x11x10. At edge on pile 50% small droppings - of juv.? 11x7x6; 12x6x7 - shape . Another pile, center, ten droppings  11x3x4; 12x4x4. There prob. from juv. of 15A8J. When they retreat at night steep ridge is rolling bare country with areas of short grass or Festuca clumps - no water.

April 23, 1952. Old skull had teeth (upper canines) just erupting & 4th large molar also just thru bone. C.b. length 210, zyg. width 117 mm.

April 25, 1952. 5:50 a.m., saw 6 ad. 15J. prone on hillside nr. camp where I have seen in early morning on 2 or 3 previous occasions. This spot is in daylight feeding area, 50 yds. up slope of small ridge, among 4' boulders. 1:50 p.m., drove down road. In B.B. Draw, 10A (1 pregn.) + 3 juvs. Adult, no short ear, in W. 139 Draw. Carcass of adult in stream - about 1 month dead - hind foot 390; c.b. length skull, 215. Canines present & sharp. 3 (min. or 2?) at stream at 137. 2 ad. 150 yrs. N. 133. 4. Evidence of much truck work in road repair km. 134-139, but road camp now mowed & such disturbance probably ended. Sheep grazing at 135 1/2. Saw none to km. 120. Stream at 130 dried up; may be some water

Vicugna

April 25, 1952

Huaylarco, 15000', Dpto. Arequipa

at head, 1/4 mile S. 130. 3:25, from atop N. 133 Ridge, ¹⁰ 8A35 on flat N. of N. limb of loop. Stream here is dry. None has recouped area inside Loop. Grass pale yellowish green. None on S. 133 Flat. Creek there dry - possibly a few small pools. 4 p.m., drove up road from 133. Still 2 N. of 133. 4. Sheep in 136 area. One ad. in W. 138.6 Draw - ears entire. 8A35 in B. B. Draw. (4:25)

April 26, 1952. 6 a.m., shooting from truck at vicuña

near road seen. 4-4:30 p.m., drove down road 140 to 133. at 140, a group 6A45, 4A15, & 6A (♂-♀♀) all within 100 yds. as if displaced. Light sided ♂ & ad. ♀ opposite 139. 4. About 16 ♂♂ (7 est. yearlings) across stream from 139 to E. In W. 139 Draw, usual 7A25, shorter LE ♂ leading. 5, anal. ♂♂, near road at 138. 7. Across stream from 138.8, usual 3. 4 (reid. gp.?) up W. 138.1 Draw. 7 ad. across stream from 138. 3A25 near stream at 137.5. Ad. + 2 younger (2 yrs. old?) across stream from 137.4 - there in E. 137 Draw at 4:50 p.m. None on S. 133 Flat - usual brown + white alpacas there. Sheep on ridge across stream from 136.3. 2/10 cunnulus, calm. I drove back up road. No pregnant ♀♀ in any of above groups! 5 p.m., the 7 ad. 100 yds. NW of 137. 9. Ad. of ♂ & 3 yrl. came to 50 yds. NW of 138 to challenge them. Across stream from 138.3, 5 (~~apparently~~ ² ~~♂♂~~). One raised fore pike, walking fore-foot alternately on it reid x, & gave waf bowl - repeated twice more. One of group a yearling - all side color of dorsal part, no side line of separation between darker color below & lighter above but size almost equal to others. This line conspicuous in side view in evening sunshine. There went

Vicugna

April 26, 1952

Huaylarco, 15000', Opto. Arequipa

SW to edge E. 138 Flat (^{probably} incident 5; none pregnant). 5:15, km. 139: 7A2J 50 yds. E. road. Across stream to E., group of 3♂, & 1♀, tributary to B.B. Draw, no juvs. Play fight between 2 of 11. There prob. all ♂♂ (maybe 3 not). 5:25, a group of 8A3J ascended W. 139.3 Draw & were attacked by light riled ♂ & finally went off up canyon to N. Another ♂ had joined in the chasing & followed the 8A, uttering long low upper "C" calls with waver-ing quality. Finally, near road at 139.4, this one ran at the ♀♀ + ♂, in rear, attacked. The two fought vicuña, biting necks, tripping legs, putting neck over others, with great vigor, then the odd one was chased 50 yds. across road. The two ♂♂ stood 10 yds. apart, mouths agape, an object (hair tuft?) in mouth of group ♂. 5:30, ♂ with group & other ♂ grazing 20 yds. distant. One of the 8A heavily pregnant. Km. 140, 40 ♂♂, some fighting & chasing in group. 5A1J, one preg. ♀, on E. side road at 140½. Sunset 5:40.

April 28, 1952. 6 a.m., the 6A1J prone on hillside 300 yds. S. camp as usual. 11:45 am. - 12 m., draw down road 140 to 133. 20± ♂♂ at stream, km. 140, some bathing. 6A4J across on NW side road at 139.1. ♂ off 7A2J in W. 139 Draw chased them across to SE side road. ♂ + 3 yrl. at road at 138.3. Men & dog at 137.6, & no vicuñas seen until 2 ad. (replace former) 100 yds. N. of 133.4. None on S. 133 Flat. Drove to Arequipa. Reproduction no better than Huaylarco. 9A1J in one group; 6A4J in another; 7A3J, however, in another. The stockkeeper at Arequipa said Indians get many vicuñas.

Vicugna

April 28, 1952 Huaylarca, 15300', Dpto. Arequipa
 Returning 133 to 139 at 4-4:15 p.m. GAIT at SE end of
 S. 133 Flat. Two ad. 100 yds. N. 133. 4. 5 in head E. 138. 2
 Draw. ♂ + 3 yrl. 100 yds. NW of 138. 3 on slope across
 stream from 138. 8. 7A 2J in W. 139 Draw. 6A 4J in
 B.B. Draw. Up N. fork of E. 139 Draw, at least 7A 2J.

May 3, 1952. Old skulls examined. One with full
 "fighting teeth" has c-l length 213, zyg. width 120. One
 with longest fighting tooth 2 mm. out of bone (posterior
 upper), c-l length 210, zyg. width 119; about same
 as adult. Another ad. 216 x 112. These lengths include dried
 cartilage at ant. tip upper jaw.

~~Apr~~ May 3, 1952. 1:45, having driven down road from 140
 & seen none (sheep in E. 138. 2 Draw), saw 14A 8J, one of
 ad. pregnant, on short grass across from 135. 5. Apparently
 this group has grown from disbanding of a nearby one.
 No juvs. appear recent - under 2 wks. old. One juv. stalk-
 ed a group of Thomomys, then ran at them & they flushed.
 This possibly the 134-135 ggs. at km. 134, 2 ad., ♂ + ♀.
 None on S. 133 Flat. || About 3:30 p.m., 2J 4A at km. 142
 from Puno. Chalhuanca-Puquio Road, Dpto. Arequipa

May 11, 1952. Near road, 13700-14700', km. 160-¹⁸¹~~180~~
 from turnoff to Puquio (m. Alvaray). 9 (0 juv.), 1. 3 (0 juv.)
 4 (1 juv.), 8 (0 juv.), 5 (1 juv.), 1. 3 (0). Some seen right away
 alpacas without alterations.

May 12, 1952 2.5 mi. SW Chalhuanca, 14500'
 About 3 p.m., 5 AIT on wet grass slope. Spaced in
 open, 150 yds. away. Finally they noticed me & ♂ gave high

Vicugna

Apurimac, Peru

May 12, 1952

25 mi. SW Chalhuanca, 14500' Dpto.

call. ♀♀ + juv. (rose) fled 50 yds. ♂ stayed & gave warbling call again & again, finally joining rear of ♀♀. Occasionally ♂ call low & grating - crow like or Brooklyn-bird like. Not a wary group.

May 13, 1952. Road toward Pucuro from Chalhuanca

From camp to road saw 7A15, 2A, 4A. Road hit at km. 101 (from Abancay) (= mileage 113 on speedometer). Km. 200 =

119 speedometer. Km. 205, 1A, 4A, 1A, 3A, 4A (A = not juv.).

Km. 218, 1A, 10A15. Rocky, grassy & Eucnophyllum plain, rather dry. Km. 431, 4A, 6A, 4A, 12A, 4A, 6A25, 6A15. Km. 436 = 131.9 miles on speedometer. Miles 132.2,

5A, 6A, 4A, 5A, 4A 25, 2A15, 7A15. Miles 32.7, 7A15.

Miles 33.2, 5A 25. A flowing stream crossed at mile 33.8.

Rocky, green grass rolling country. Llamas & alpacas in groups 10±. 10.m. Speedometer 34.7, 7A.

35.3, 5A, 7A15. 35.4, 33A, 5A, 7A, 4A, 7A15, 2A15. Miles 36.1, 2A, 2A, 3A. 38.1, 9A, 2A, 5A.

39.1, 6A 25, 7A15. 39.6, 4A, 3A. 40.2, 7A 25, 5A, 45A, 4A. 40.5, 6A, 1A. 40.8, 7A15. 41.1,

5A15, 2A, 4A, 4A. ^{m.} 42.4 = km. 70 from Pucuro.

Miles 42.6, 4A, 2A, 3A, 12A. 42.8, 8A 25, 4A. 43.2, 4A15, 3A. Large lake with flamingos. 43.3, 20

(5+ yearlings), ^{1/2} 43.9, 9A 35. 44.2, 3A 55. Km. 60 = speedometer 48.9.

May 14, 1952 Driving on past lakes. Km. 54 from Pucuro, 46 0707. Not counting all today. Km. 49,

8A 35. Km. 46, road started down & vicuñas scarce tho a group of 7 seen at 13000'. Pucuro at 10500'.

Vicuña

May ¹⁴ 16, 1952 (NE of)
 Nr. Puquio, Dpto. Ayacucho
 Yesterdays count within 400 yds. road, all that were seen. Perhaps missed some juvs. but reproduction obviously poor. Indians (walls, houses) scarce but area appeared well grazed.

May 16, 1952 Road Puquio to Nazca
 About 40 miles on road from Puquio, road up to over 13000' + many vicuñas seen on rolling grassy low hills - altiplano. ~~Some~~ Some as low as 12400'.

May 30, 1952 Huaylarco area, 13000'
 Driving thru at midday. Area drier than when last seen - less green. Km. 127½, green flat in gravel pampa, 5A 25. Km. 130, 4A 25 on gravel pampa. Km. 133, 16 or + 0707 at N. 133 Ridge, an Indian with gun stalking them. On barren hills S. of S. 133 Flat, at least 18 with juvs. 100 yds. N. of km. 134, 14 ad. (perhaps a few more) with 9 or + juvs. - same groups as seen ^{in April} ~~about~~ here? Km. 135.1, 3A, 4 38 0707 to N. of road. In E. 137.5 Draw, 5A 25. at 138.2, A + 4 yrl. 50 yds. E. road. E. 138.4 Draw, 2, no juvs. 50 yds. W. of 138.5, 2A, yrl. 4 juv. across from 138.8, 5 (no juvs.). E. 139 Draw, 3A 35, a lone ad. (the light sided one it appeared) by road. Men at stream at 139.4. The 9 juvs. + 14 ad. at km. 134 holds record, I think, for good survival of young.

June 19-27, 1952 Hda. Colocata, 7 mi. SW P. tina, Dpto. Puno
 Sr. Paredes estimates 40-50 young from about 200 ad. ♀♀ here. He blames foxes for poor reproduction, not about.

Vicuña

June 19-27, 1952

Heda. Calacala, 7 mi. SW Pitinga, Dpto. Puno

tion or stillbirths. Actually no direct attacks seen by foxes. These present but not numerous (few tracks, droppings). Two haque dogs killed one young vicuña, Pardo said, the mother running off. I walked thru vicuña pasture with a black dog. Vicuñas showed great interest & some approached, looking to 100'. Of several (no juvs.) near haque, two attacked dog by running at it, dog fleeing & barking. I had to protect dog. Attacks not full adults. In another pasture, group with juvs. showed interest in dog but finally departed, but a big paco-vicuña chased dog several times, dog fleeing. In daytime a fox would probably have difficulty in getting a vicuña from group, because of able attacks with foxes. Pardo says young vicuña mate when 1 yr. old, have first young at 2 yrs. ^(???) with ² ~~bands~~ all year but nearly all young born in March. Occasional mating as late as June. Alpacas do not get lateral incisors until 2 year old, the curved "fighting teeth" at greater age. I got a skull of ad. ♂ old alpaca for specimen. Pardo believes thousands (= hundreds?) of pelts vicuñas, mainly juvs., smuggled to Bolivia each year. He should know as only man able to sell wool legally. Pardo says he once definitely crossed 2 paco-vicuñas.

June 29, 1952

Tuliaca, Dpto. Puno

Mrs. Duffie said that recently almost every week a vicuña robe, all cría, is offered there, for as little as \$15 to \$30. One had 16 pelts. Dr. Stiles came from Bolivia & brought a vicuña robe. He says now no restrictions on selling & sale there & vicuña products for sale everywhere. This of course increases smuggling from Peru. End Peru.

Vicuña

CHILE

September 3, 1952 E. of Chiquicamata, P. Antofagasta,
 ascending road toward Pampa Perdida from Ojos de San
 Pedro, saw 5 on bunch grass dry wide mod. slope
 near first summit (14500') near rhea. There ran
 across road 400 yds. ahead of car & kept going. Very
 wild it appeared. Later in day saw 20 (no juvs.) in
 same area. There also skittish & made for higher
 steeper rocky slopes. One seen near Hilala (Inocaviri).
 Ejercement piles small & rare. Vicuñas appeared pale
 to us. William Rudolph, chief engineer at Chiqui-
 camata and well informed about that region, told me
 that the sulphur miners kill the vicuñas for meat
 and are driving them back into Bolivia, & that people
 run vicuñas down with cars as well as shoot them.
 Rodriguez of Pesqueras y Caza, Santiago, was in this
 area and interested in protecting vicuñas. Local people told
 me there are no hunting seasons or prohibitions in Tarapaca,
 Antofagasta, or Atacama, but are farther E.

October 2, 1952 E. of Chiquicamata, Prov. Antof.
 Driving toward Toco from Ojos de San Pedro, saw
 one in low tala 17 1/2 miles out, & one 25 miles
 out in bunch grass (near llamas & 1 rhea).
 Much gently sloping grassy (brown bunch grass)
 pampa without vicuñas or other stock - lack
 water? or shot out near good roads? The 2 at
 about 13, & 14,000 ft.

October 3, 1952 Prov. Antof.
 Nr. Putona, 65 ± mi. E. Calama,
 None seen driving from Toco to Cerro Tatis to

Vicugna

Chile
October 3, 1952 65 $\frac{1}{2}$ mi. E. Calama, Prov. Antof.,
about 5 mi. N. Putana. Much gently sloping ~~but~~ ^{springy}
puna grass area, both sandy & rocky, & occasional
water. Many roads. Former large population vicuñas?

October 4, 1952 Nr. Cerro Tatio, 65 $\frac{1}{2}$ mi. E. Calama
Found one skull near camp. Drove toward Putana
& saw 2 in a dry wash at edge springy puna grass
area, there at about 14300', about 3 mi. N. of V. Putana.
These very yellowish on sides up to "lateral line", as
was one seen yesterday near Cabana. Apparent yearlings.
Returning to lagunas of Tatio, saw 2 to W. of road, $\frac{1}{4}$
mile from stream, about 5 mi. S. of the geysers.

October 5, 1952. Found atop a springy puna grass hill
about 2 miles SW of the geyser flat. One on N. side of
15000' pass on road between Tocaime & Tatio.

October 6, 1952 Nr. Ojos San Pedro, 55 mi. NE Calama
at 14500' on gentle springy puna grass slope, saw one
on about 200 yds. from a running rhea. Vicuña stopped
300 yds. from road & observed car. Driving toward
Tocaime, about 6 p.m., saw groups 7 (2 juvs.) on springy
puna grass pampa, $\frac{1}{2}$ mile from steeper slopes. There
about 3 mi. S of the sulphur loading plant at W. foot
of Cabana - in spite of fact that Rudolph believes
much killing on sulphur mena.

October 18, 1952 Est. San Pedro, Prov. Antofagasta, Chile
Miguel Urdangerin said he had killed vicuñas within
5 km. to W. of Est. San Pedro when a boy (20-25 yrs. age
probably). Erik Nelson said vicuñas on ^{pampa} ~~pass~~ near Tatio
sulphur plant (20 $\frac{1}{2}$ km. W. of Putana). A man from the Tatio mine

Cerro Test

#

7

7

Vol. Col.

7

Plant Test

8j

Calusa -

7

8

Pumpkin

7

Vicuña

October 18, 1952 Chile
Est. San Pedro, Prov. Antofagasta,
(sulphur) on S. side Cerro Tatio, said 20 or 30 vicuñas
& many killed for meat.
sometimes in a band in that area. A truck driver said he
had seen many & chased them closely in car near Laguna
Colorado (Bolivia, to E. of Siloli).

October 24, 1952. With Eric Nulsen & Miguel Urdangarín
drove from Lonzor camp to high on Volcan Apagado, thence
to Planta Tatio, Cerro Tatio, Ojos San Pedro & Est. S.P. Saw
about 35 vicuñas in groups of 1 to 8. Nearest seen
was 200 yds. (running) and none stopped closer than
400 yds., some taking flight & running when 1/2 mile away.
as usual fleeing ones made for higher ground. People here
think young born about January - 2 mos. earlier
than in S. Peru. From 6:30 to 7:30 a.m., on pampas between
Cerro Tatio & Cerro Colorado, groups of 4, 7, 7, & 4 seen.
Between C. Colorado & Planta Tatio, 4 & 4. Between Calama
& N. of Parí, 8 & 1, on S. (hill) side road - these thought
to be rare in this part by Urdangarín because of
much & long traffic. Many tracks & small feces
sites seen on barren pampa but all vicuñas in
brushy grass areas of gentle slopes. Apparently
little hesitation about killing them here tho ^{everyone} ~~of course~~
knows it is prohibited by law. Eric & Miguel had vicuña
sweaters & scarfs - the yarn & resulting product thin
but very pliable & soft. Fibers perhaps too soft for the
resilience ^{resilience} of alpaca. Many high power rifles at Chiguí
& Urdangarín has 5⁺ at San Pedro. 22 ammo. sold
in Calama. No ^{many} more guns & ammo than in Peru.

Vicuña

Chile,

October 28, 1952 Cerro Tatio, 14000', Prov. Antof.,

Saw 3 on bunch grass gentle slope at edge pampa to SW of Cerro Tatio (near road to Planta Tatio), close to river.

October 30, 1952. In drive from 2-6 p.m. from Cerro Tatio to Cerro Colorado to Planta Tatio & C. Tatio, saw about 30 total, largest group 6 (prob. ♂-♀ group). Best area seems to be between where road crosses Cerro Tatio & Pabellon, & grassy slopes E. of this line. All seen sufficiently close had cream color below lateral line. Nearest seen were 150 yds. from car & could have been killed with .22 rifle.

November 1, 1952. Two for 2+ hrs. at green spot near stream 2 mi. S. of Tatio layers. A group of 6 including 1 juv. seen ascending rocky slope NE of Tatio layer flat. They went to grassy bowl 600± yds. up slope when alarmed by car approaching 1/4 mile away.

November 5, 1952 Chiguicamata, Chile

Mr. W. Rudolph says he believes many more vicuñas here in the 1920's. Fewer roads then, but in a days mule ride beyond Tarasca one was sure to see at least 20.

November 6, 1952 Nr. Ojos San Pedro, Prov. Antof.,

Driving to Pampa Perdida from Ojos, saw 3 near start of grade, a group of 4 at Pampa Perdida & 2 singles near that area. The 4 stood up when I parked 300 yds. away; then 2 down again. When I stepped from car all ran away fast.

- End trip -

X

